Grant (W. R.)

AN

INTRODUCTORY LECTURE

TO THE COURSE

OF

ANATOMY AND PHYSIOLOGY

IN THE

MEDICAL DEPARTMENT

OF

PENNSYLVANIA COLLEGE,

PHILADELPHIA.

DELIVERED TUESDAY, NOVEMBER 4TH, 1845,

BY WILLIAM R. GRANT, M. D.

PROFESSOR OF ANATOMY, &C.

PUBLISHED BY THE CLASS.

PHILADELPHIA:
BARRETT & JONES, PRINTERS, 34 CARTER'S ALLEY.
1845.

CORRESPONDENCE.

PHILADELPHIA, Nov. 10th, 1845.

DEAR SIR :—At a meeting of the Medical Class of Pennsylvania College, (Mr. C. A. Cowgill, of Del., Chairman, and Mr. B. F. Rohrer, of Penna., Secretary,) we, the undersigned, were appointed a committee to solicit from you a copy of your interesting Introductory Lecture for publication.

In complying with that request, we also feel a pleasure in tendering to you, from them and us, expressions of esteem and regard.

Very truly yours, &c.

BENJAMIN F. CHATHAM, New Jersey.
HENRY S. HUBER, Illinois.
WILLIAM TERRY, Connecticut.
F. D. DELLINGER, Missouri.
N. CHAPMAN SKINNER, N. Carolina.
JOHN L. HILL, Ohio,
DAVID P. HAYS, Virginia.
DRAPER W. NEWTON, New York.
A. MACDONALD, Nova Scotia.
BARTON C. LLOYD, Penna.
E. C. LUZENBERG, Louisiana.
JOHN E. WHITESIDE, Penna.
J. THARP, Delaware.
JACOB J. WEAVER, Penna.
WILLIAM W. ESTABROOK, N. Brunswick.

Prof. W. R. GRANT.

PENNA. MED. COLLEGE, Nov. 11th. 1845.

GENTLEMEN :—I have just received your note of yesterday, soliciting a copy of my Introductory Lecture for publication. Having declined a similar application last year, I feel, in a measure, under obligation to comply, although I regret that the lecture is not more worthy of this flattering distinction. It is, however, at your service.

Accept for yourselves, gentlemen, and the Class which you represent, my sincere regards.

Very respectfully yours, &c.
W. R. GRANT.

To Messrs. Chatham, Huber, and others, } Committee.

INTRODUCTORY.

GENTLEMEN:

Your presence here this evening reminds us that another year has gone to mingle with the mighty past, bearing upon its bosom many a scene of sorrow and of gladness. The summer warbler, which waked the echoes of the secluded vale, in answer to his grateful song, has hushed his joyous notes, and passed to other climes, there to re-sing the praises of that kind hand which ever ministers to his wants. The bright green of summer's foliage has been changed by autumn's chill touch; the forest which clothe the mountain's rugged sides, has either robed itself in the many colored livery of the rainbow,—to tell that change is an attribute of matter—or has stripped to the leafless condition of winter's dreary landscape, to show how transitory the brightest glories of earth must ever be. All speak of the stealthy steps of time. No rushing sound has fallen upon the ear to mark the flight of days and of months, yet noiselessly have they fled through the various abodes of men.

This crowded hall reminds us that the active business of another session is about commencing—and we bid you all hail. Heretofore we have extended the hand of welcome with trembling; for our gallant ship, "The Pennsylvania" (College,) was comparatively new, and lately manned; and although our hopes were sanguine as to final success, yet we had not navigated sufficiently long to assure the world that we might, with safety, spread our canvass to compete with old but generous rivals, whose brows have oft been graced with the victor's garland. But with the diffidence and ardor becoming youth, we have tried, our fondest expectations have been realized, and all fear and dismay have fled.

Gentlemen: such a scene as the present, brings to the mind various and conflicting thoughts. Faces which were wont to greet us on similar occasions, are absent—thus reminding us, in a voice silent but solemn, that *change* is a great law of our existence. Some of those familiar ones have passed from the secluded gymnasium, and entered the thronged arena of active life. They have bid adieu to the halls of their Alma Mater, and are now seeking homes in this wide extended country. They have secured their clearings in the inland sea, and have boldly set their compass for the untried ocean—and may He who holds the winds in his hands give them a prosperous voyage.

There are, however, some here whom we recognize as old friends, thus connecting the present with the past. *You*, gentlemen, have tried us, and we rejoice that you are willing to try us again; and be assured, our earnest endeavors will be to assist you on with your armour, so that you may soon join your old companions in waging war against the common enemy, *Disease.*

But there are others here who, to us, are yet strangers, but with whom we hope soon to become acquainted—thus connecting the present with the future. We, therefore, extend a kind welcome to you all; and when the weight of years shall constrain us to renew our youth, by reviewing the bright scenes of the past, we hope to be able to point to many of you with joyous satisfaction, as did the Roman Cornelia to her sons, and with her exclaim, "These are my jewels."

Gentlemen: the most, if not all of you, I presume, have come to our hospitable city to receive medical instruction. You will not be disappointed, whether you select this institution or either of the other branches of the great school of Philadelphia.

We again welcome you and your friends, students of one profession, and candidates for the same high and honorable calling.

To as many as will honor me with their attendance, this winter, it becomes my duty, and will be my earnest endeavor to give instruction in the departments of Anatomy and Physiology.

With your indulgence, then, I will, on this occasion, make some general remarks on the necessity of the study of these branches of medical education, with their nature or tendency.

Doubtless the first question which will present itself to the mind of

the uninitiated, is that American query, "cui bono"—to which we may briefly answer, in the language of one of the wise men of Greece, "Γνωθι σεαυτον."

These branches are at the very foundation of all medical knowledge; neglect *them*, and empiricism, in all its forms and varieties, will be reinthroned, bringing in its train the folly and absurdity, danger and ruin, which make quackery so hateful and wicked.

What would you think of the mechanic who would confidently undertake to repair or improve a machine, when he was totally ignorant of its structure—the effect of one part upon the others; who had never seen its hidden departments or secret springs, and who, before, had not made himself acquainted with the uses, nor even handled the instruments, with which it was requisite to examine, in order to ascertain wherein the said machine was injured or defective? Would he be worthy of your confidence or esteem, notwithstanding his loud pretensions to ingenuity or mechanical experience? Certainly not. How much less, then, is *he* to be trusted, who professes to practice the healing art, without any knowledge of the structure of the body, its relations or functions, or the laws which govern their actions?

It is thought presumptuous and foolish for a man to engage in any business or trade, without first preparing himself for his vocation by a regular process of training or apprenticeship. Without this, the public can have no confidence in his knowledge or skill; but in a calling which takes cognizance of the health and life (it may be,) of our fellow mortals, how much indifference is manifested by the community at large, as is evinced by the ease with which they allow themselves to become the dupes of the designing and ignorant pretender. How much daring and fool hardiness is shewn by the latter in the profession and practice of his new but responsible vocation?

Without any previous study, we see the blacksmith throwing aside his hammer and tongs, the tailor his scisssors and goose, the shoemaker his lap-stone and awl,each, as if by magic, pretending to have discovered a "new and better way," dealing out his herbs and No. six's, his decilienth pills, and infinitesimal powders, or perchance, throwing "medi-

cine to the dogs," puts himself in a sweat by throwing cold water on his patients. They have their reward; they receive credit when none is deserved, and escape censure when censure is due, because their employers are as ignorant as themselves, and *both* are willing to have it so. And last, though not least, in their estimation, they receive for such interested motives, and valueless services, what the faithful, competent, and conscientious physician often never receives. I mean pecuniary remuneration. This is *their* chief end and aim, and they attain it.

But, gentlemen, yours is a higher and nobler calling, as has been ably shewn to you in the previous lecture by my colleague, the Professor of the Practice. The prize to which we point, though high and more difficult to attain, is well worthy of your eager pursuit and unwearying application. You must qualify yourselves in this, as in every thing else, by diligence and perseverance in the use of means. Among these, Anatomy and Physiology will guide your steps through an obscure labyrinth, where a variety of objects present themselves in such groups as at first would seem to perplex and confuse the mind. *These* unravel the primary difficulties in your path, by unfolding to view the diversity of parts—their combination and disposition—their object and movements. This intricacy will, by degrees, be removed, and you will see that there is established in our systems the most perfect harmony—each department of organs and tissues formed for a special purpose, with geometrical exactness, and, according to laws established, by unerring wisdom.

Anatomy will teach you of what kind of tissues all the parts of the body are composed: it shews their *figure*, *texture*, *firmness*, *connection*, and *relations* to each other. From this source we derive our first knowledge of the seat of diseases, of the normal or abnormal arrangements of parts, of the danger or safety of an operation, and learn the best manner of performing it with dexterity and success. In the words of another, "it is dissection alone that teaches you where you can cut the living body with freedom and despatch, where you *may* venture with great caution and delicacy; and where you must not, on any account, *attempt* it." "It is this which informs the *head*, gives dexterity to the *hand*, and familiarizes the *heart* with

a kind of necessary inhumanity—the use of cutting instruments on our fellow creatures."

With what propriety, then, can any man assume the title or responsibility of a physician who is ignorant of Anatomy and Physiology? The surgeon cannot apply his knife with any degree of safety or well-grounded confidence in the taking up of arteries, in removing of tumours, particularly in the neighbourhood of important organs; in operating for hernia, or cutting for the stone. The *obstetrician* is not prepared to give relief, when the powers of nature fail, in consequence of obstruction or derangement, requiring his active and prompt interference, without some previous anatomical and physiological knowledge; nor can the general practitioner of medicine understand the pathology or treatment of disease, without first studiously and perseveringly investigating the condition of the different organs and tissues in a state of health, noting their appearance and properties, their changes in disease, and the effects of the various remedial agents, which, by his knowledge of Materia Medica and Therapeutics, he may bring to his aid.

These are the studies which lie at the foundation of all the other branches of the healing art. These may be called the pillars which support the superstructure of Medical Science.

The importance of these studies to the student of medicine is so evident, that it might at first appear to require no comment from us. But when we see so many *practically* denying the truth, however willing they may be to sanction it in theory, and some discarding its advantages altogether, it becomes, in my estimation, a duty to enforce it on all proper occasions.

Look at the bold empiric who professes to cure, without any medical knowledge but such as he may have acquired by what he calls *experience*, or a mass of material misnamed *facts*, based upon ignorance, and imposed upon the simple and credulous by high-sounding pretensions and false assertions.

Hoping that there are none present (whose intentions are to become qualified physicians,) who undervalue the importance of the subject, but consider it as essential to them, as is the knowledge of grammar

to the student of Rhetoric, we pass on to make some remarks for the benefit of others who may consider themselves exempted.

And, first. The man of liberal education (I care not what his business in life,) should not consider his curriculum of study complete until he has included the noblest of all studies—Man.

Is it not wonderful, and might I not say melancholy, to see the ignorance which prevails even among our scientific and literary men upon this subject?

They seem perfectly at home and delighted with the composition of a *rock*, the peculiarities of a *shell*, the structure of a *flower*, or, perhaps, with the anatomy, habits, and instincts of the *inferior creation;* and yet, strange to say, are profoundly ignorant of their own systems —have neglected to study *that tenement* which Deity has seen fit to illuminate with a scintillation from his own being.

They are loud in their praises (and deservedly so,) of the *mind* of man, and yet are unacquainted with the mechanism of the *casket* which contains this *precious jewel*—the wonders of which are just as astonishing, and much more comprehensible.

Besides, this knowledge, if generally diffused, might become practically useful to the community at large, as well as ornamental to the scholar. It ought to be the endeavor of every one, rather to prevent disease than to depend upon the resources of the curative art to remove it. But how can this be done, unless the structure and functions of the body be in some measure understood, so that the influences of foreign agencies may be anticipated, and danger avoided. What would be thought of the Governor of a besieged city who would fail to examine the strength of his battlements, the extent of his fortifications, the amount of his stores?—who would not take the precaution to guard the passes by which the foe could approach—who would neglect to ascertain the position, the strength, and the probable manner of assault of the enemy? Surely, all would look upon him as a traitor to his cause, or, at least, as unfit for his station. And yet, do those persons act differently in principle, who neglect to make themselves acquainted with the condition and peculiarities of their bodies, in reference to diseases, when they know that a wily and formidable enemy is ever attempting to mar their pleasure, and rob them of their peace? If men were to study their systems better, and use more pre-

cautions, they would be racked by fewer pains, and have a much slighter *experimental* acquaintance with therapeutics.

Again, to him who loves to contemplate the wisdom and skill of the great Architect of the Universe, Anatomy and Physiology present probably the richest field.

Astronomy may, indeed, bear more magnificent testimony to the POWER of that hand which broke the rule of Chaos, when

> "Lo! fierce and fresh a radiant host of stars
> Wheel'd round the Heavens upon their burning cars;"

or to the potency of that voice

> "Which spake—and lo! a universe was born,
> And Light flashed from God for her birth-day morn."

Geology may tell in loftier strains of the wonderful operations of Deity, as recorded in the historic page of the valley and the mountain, but the *body* of man, in its structure and functions, speaks in a much more intelligible voice, of the wisdom of that mind which planned, and the power and skill of that hand which formed it.

I am aware that it has been contended by some, that these studies have a tendency to produce scepticism, but it has ever been a mystery to me how such a result could be produced.

If the existence of design will prove the previous existence of a designer, I ask, where can you go for stronger proof or clearer evidence of a great first cause, than to the mutual relation, and peculiar adaptation of the different parts of the human body?

Design and desired results meet the student of Anatomy and Physiology at every step; and he must be blind, blind as those who *will* not see, if he do not raise his hands in astonishment, and exclaim with the royal student of nature's wonders of old, "I will praise thee, for I am fearfully und wonderfully made: marvellous are thy works."

True, these studies may be perverted by thoughtless or designing men, and what kind of human knowledge has not suffered the same fate? Has not Christianity itself been prostituted to the basest purposes, and made to minister to the vilest ends? So this department of Medical Science, valuable as it is, may be unduly exalted by the enthusiast or fanatic, and thus turned from its legitimate tendency.

Let us now briefly advert to a few of the contrivances of the human body, and see if design be not written upon them, as with a sunbeam, and that the skeptic must be mad, when he pleads necessity, or chance, or a principle of order, as the explanation of peculiar arrangements.

Look, for instance, at the skeleton, principally designed to give support and protection, and that it might the better answer the desired end, firm and resisting, possessing in a healthy state but little sensibility.

You see some portions of it forming arches, cavities, and canals, for the reception and safe-keeping of delicate or important vital parts. The brain, for instance, is securely lodged within the cavity of the skull—exposed, as it would be from its position under other circumstances, to constant danger—but here perfectly secured from ordinary violence.

True, in the fœtus and young child the bones are soft and yielding, and in the skull partially membranous—for wise purposes. By this arrangement the fœtal head can be diminished in size and made to pass more easily and without danger to mother or child through the unyielding straits of the pelvis. After birth and during childhood, the same peculiar elastic character facilitates the more perfect development of the brain within. Whilst the child is young and helpless the watchful and tender care of a mother or guardian compensates for any lack of strength or security; but when the individual arrives at mature age, and full development, and is intended to become his own guardian and provider, *then* the sutures are found united and the fontanels closed—presenting *now* a strong and impregnable barrier, sufficient to resist, unharmed, any ordinary forces. You now see the different bones of which the cranium was originally composed joined together in the most secure manner possible—the outer fibrous table being dovetailed or morticed one part into the other, while the inner or tablea vitrea, (its extreme hardness or glassy character, not admitting with safety of this wonderful arrangement,) is applied edge to edge in a linear form by a kind of suture, technically called *Harmonia*, so that there is no danger of minute portions being chipped off, which would be likely to occur from falls or blows, if it had been scolloped or serrated like its stronger neighbor. For greater security still, there is placed between

the two a spongy or cellular structure called diplœ, which, according to the late venerable Dr. Physic, is intended to deaden or lessen the force of blows or impinging bodies. Besides, there is placed over all a helmet of hair and thickened integument, and within, a strong and resisting fibrous envelope (the *dura mater*)—and the whole is placed on a yielding but elastic column (the spine). The mode of union of the several tables, as you are no doubt aware, has been copied by the carpenter and glazier, and the helmet of hair imitated by the ancient warrior; though each and all of them may have been ignorant of the source from which these important lessons were originally derived.

If more proof of wisdom or design is required, examine the *form* of this arch, composed of the eight bones of the cranium—abutted and strengthened inferiorly by the face and spinal column. Those who are qualified to judge in such matters, declare it to be the strongest model of an arch with which they are acquainted—capable of sustaining an incredible weight, and of resisting ordinary violence without fracture or material injury. As moderate pressure on every well-formed arch only tends to bind its different parts more closely and strongly together; so ordinary weight on this living arch will not cause it to yield or separate, and it is only when resistance is no longer possible, that it becomes not separated, but crushed *en masse*.

Examine, again, the walls and survey the battlements of this *Fort Divine!* and you will discover recesses, retreats, and places of accommodation for the sentinels, spies, and agents of the brain within—with various avenues and openings of communication—some direct and others meandering and intricate; but all secure. Imagine the delicate eye, constantly on the look-out during our waking hours, safely lodged in its deep bony orbit, and protected additionally in front by a muscular covering. Next, see the inner division of the *ear*, which alone contains the organs *essential* to hearing, placed in the interior of a bone, of rocky hardness, and great strength, consequently secure and unmolested; the nasal bridge and its strong piers guarding and surrounding the weak, turbinated, and ethmoidal bones, with their schneiderian membrane and the delicate pulpy filiments of the olfactory nerve; and lower down you see the hard palate, dental arches, with their powerful maxillary abutments, securing the important organs of *speech* and of *taste*.

Examine, next, the thoracic cavity, bounded and sustained by the spinal column behind,—by the bones of the sternum in front—and by the ribs laterally, with the scapulæ and clavicles superadded. Why so many bolts and barriers? Why, again, guard with so much care this second cavity?

It is, gentlemen, to ensure the safe-keeping and undisturbed and harmonious action of the faithful and untiring ministers of life—the heart and lungs, with their adjuncts and coadjutors, the *aorta*, *venæ avæ*, and *thoracic duct*, in carrying on the great but mysterious work of vital phenomena.

Descend now to the pelvis; you perceive it is well adapted to support the trunk, and to give firm and secure attachment to the inferior extremities of the body; its cavity occupied by important viscera—its expanded ilia sustaining in part the intestines in both sexes, and the gravid uterus in the female.

The pubic arch in the female, (but observe, not so in the male,) wonderfully moulded, as if it were formed by the fœtal head, in its passage into the world whilst the bones of the pelvis were yet in a soft and plastic state. Does not this show a knowledge of the end from the beginning?

As man, with the higher order of animals, was destined for locomotion, and designed to move in different ways, and for a variety of purposes, it was necessary that the skeleton should be in many and detached pieces; these vary in size and figure, according to the uses intended to be subserved by them separate or united. In the extremities are seen the principal long bones, employed as levers for motion, and pillars for support; and that there might be shown us a lesson of economy in the use of means compatible with the end to be attained, we discover that these bones are not solid but hollow cylinders—thus securing equal strength without unnecessary weight. This is most beautifully seen in the whole of the osseous system of birds—where power of resistance, combined with great *buoyancy*, was an object of primary importance to them.

Respecting the joints and movements of different parts, we discover again the greatest economy and skill; for instance, where flexion and extension only were required, as between the humerus and ulna, we

find this accomplished by the simple ginglimoid or hinge joint, which admits of none other except these motions.

When, however, it became necessary to combine a greater variety with more freedom of action, quite a different arrangement of things is found to exist, as in the ball and socket joints; in the shoulder, for instance, almost every variety is executed by the single or combined action of certain muscles, such as flexion, extension, abduction, adduction, rotation, gliding, and circumduction.

To save power, and to ensure ease and graceful action, without any jarring or friction, it was requisite to provide a smooth elastic covering to each adjoining surface, as well as to make provision for a constant and uniform supply of some lubricating fluid—which object is admirably attained by the simple yet indispensable synovial apparatus; thus surpassing infinitely any invention of man. For here is a machine which is not only capable of repairing its own injuries, but also of regularly manufacturing and constantly applying this living oil (synovia) to its pivots and hinges.

There is also something very peculiar and remarkable about the figure and position of this living machine, which is worthy of your observation and study. It is not only erect and thus giving a commanding and distinguishing attitude to man as lord of creation, but what is more wonderful still, this erect and upright form represents an inverted cone or pyramid resting on its apex, but yet firm and secure. Notwithstanding the constant changes in the centre of gravity at every movement, the equilibrium is instantly restored and its position maintained, so that whether we contemplate the body in part or entire, standing or walking, at rest or in motion, we behold a living evidence of wisdom and skill, of ingenuity and design, far exceeding the boasted inventions of human philosophy or art.

We might, gentlemen, go on in the same manner from tissue to organ, and show other arrangements equally wonderful and perhaps *more* beautiful. Such, for instance, as the minute and intricate structure and uses of the eye; viewing it with its appendages as a telescope —an instrument of surpassing unimitable excellence, as regards both

its finish and its design ; the transparency and extreme accuracy of its *lenses ;* the perfection of their polish and arrangement ; the peculiarities of its coverings, or coats for *protection*, *absorption*, *reflection*, or *perception*—with the superadded *lachrymal* apparatus, for moisture and cleansing its surface ; with its self-acting springs and pulleys for directing and adjusting the ball ; its acromatic character and wonderful faculty of measuring the degrees of light.

We might then pass on from *optics*, emphatically deserving the name, to another branch of Natural Philosophy, viz.: *hydraulics*, and show you the mechanism of the heart and blood-vessels adjoined, with their forcing and suction power combined—self-acting, and never ceasing from the first moment of fœtal life till the final pulse in death. Then to *acoustics*, and show you the structure of the ear, its delicate membranes, minute chain of bones, and peculiar fluids intended to convey the vibration of sounds to the nerve within, concentrated by the trumpet-like instrument without ; but this would far exceed the bounds of a single lecture. These, with like subjects, will occupy our attention during the ensuing course.

If I have in any manner interested you by the few specimens which have been *but feebly* presented to you this evening, selected from what is generally considered a dry subject, I hope to be able to interest you more when we come to *show* those parts of which we have at this time only *spoken*, and to give you a demonstration of the truth, attested by nature and revelation alike,—" that man is wonderfully made."

In order, however, gentlemen, that you may not only see the wonders, but fully understand and appreciate the advantages of Anatomy, you must study it *practically ;* you must dissect the body of your fellow man ; you must examine the dead for the sake of the living ; you must take the knife in your own hand, and with it turn over again and again every leaf, and read and re-read every section and chapter of this volume of nature's works ; and not only see and hear, but handle and feel for yourselves. There is no other royal road than this, which may sometimes indeed be dreary and forbidding, but when you consider the object in view, and that to the pure all things are pure ; that duty to yourselves, and to confiding patients who may hereafter

place their health, comfort, and even life itself, in your hands, calls for it, can you be careless or indifferent? I hope not.

To enable such as desire it to enter upon and prosecute these studies to the best advantage, large, airy, and commodious rooms have been appropriated for the purpose in this Institution—lately remodeled and furnished with every thing necessary for comfort and convenience. To these Halls, consecrated to science, none are encouraged to enter but such as are actuated by the purest and most worthy motives, and who will respect, even when they dissect, the dead. All such I most cordially invite and strongly urge to prosecute this study while attending lectures, as it may, to many, be the only opportunity which will ever present itself. Do not, then, by any means, neglect the prosecution of Practical Anatomy. If you select our rooms for this purpose, it will be my pleasure to direct you in your labours, with the co-operation and aid of a zealous and attentive assistant, (Dr. Babb,) a graduate of this College.

Having now laid before you a subject worthy of your earnest regard, let me urge you to persevere in it, and your labours will be sure to meet with proportionate success. The reward of the rich, the blessing of the poor, the respect of the learned, and the justly merited esteem of the good and virtuous, will not be wanting for your encouragement; and what is more satisfactory still, those who have been distressed by sickness and ready to die, but saved by your skill, will bless you for the relief you have afforded, or the life you have prolonged.

These considerations, if *not higher*, should animate you in your noble pursuit, and determine you to persevere therein with unshaken confidence, not dispirited at the difficulties which present or the obstacles you are called upon to encounter. You may then hope to be remembered as the *ornament* and *boast* of your profession, and justly styled the guardians of the *health* and *life* of mankind.