Original Articles.

NOTES ON THE LIFE AND WRITINGS OF GERONIMO CARDANO.

BY CHARLES GREENE CUMSTON, M.D., BOSTON.

THE lives of the great physicians of antiquity and the Middle Ages cannot, I think, be devoid of interest to the present generation of the profession, and this may be particularly true of those men who are not generally known in medical science, and it is for this reason that I have selected the following biography.

Geronimo Cardano was certainly a curious personage even in his day, and his reputation is especially due to his profound knowledge of mathematical sciences and philosophy. His system of philosophy has been the cause of much eulogy in recent times, and, lastly, in his relation to us as physicians we must remember that at least one-third of his "Opera omnia" is devoted to medical subjects. His life, character and work offer to the highest point the most peculiar features. His career was an uninterrupted chain of misery, suffering and strife. He was born at Pavia on Sept. 24, 1501, although Haeser gives his birth as occurring in 1505, while Duruy places it in 1500. I believe, however, that the first date given is correct. As his mother was not married, she tried every method to procure an abortion, but without effect. It is said that she was 3 days in labor, and that finally the sectio cesarea was resorted to.

When Cardano was 4 years old he was taken to Milan, in which city his father practised in high repute, both as a physician and an advocate. In 1524 he went to Padua, and in the same year was admitted to the degree of M.A., while toward the end of the following year he received the degree of doctor of medicine.

Somewhere about the end of 1531 he married a poor woman, he himself being in the most complete misery. During the previous 10 years his impotency hindered him from having knowledge of a woman, which was a great mortification, and he attributed it to the evil influences of the planet under which he was born. When he enumerates, as he does in more places than one, the greatest misfortunes of his life, this ten years' impotency is always foremost among them.

At the age of 33 he became professor of mathematics at Milan, and 2 years later he was offered the professorship of medicine at Pavia, which he refused, as there was little likelihood of receiving a regularly paid salary. In 1539 he was admitted a member of the College of Physicians at Milan, and in 1543 he read public lectures in medicine in that city and at Pavia the year following, but discontinued them because he could not obtain payment of his salary, and he returned to Milan. In 1547 his friend Vesalius procured for him, from the King of Denmark, an offer of a pension of 800 crowns and his table, which he tells us he refused on account of the severe cold of

the climate, and also because to be well received in that kingdom he would be obliged to renounce the Catholic religion, in which he had been bred. In 1552 he went to Scotland, having been sent for by the Archbishop of St. Andrews, who had applied in vain to the physicians of the King of France, and afterwards to those of the emperor. This prelate, then about 40 years of age, had been afflicted with a shortness of breath for about 10 years, and which had returned every week for the past 2 years. He began to recover from the moment that Cardano prescribed for him. The latter took his leave of the archbishop in about 6 weeks' time, leaving him his prescriptions, which in 2 years wrought a complete cure.

Cardano's journey to Scotland gave him an opportunity of visiting several other countries. In journeying there he crossed France, and returned through the Low Countries and Germany, along the banks of the Rhine. It was on this occasion that he went to London and calculated King Edward's nativity. This tour consumed about 10 months, after which, returning to Milan, he continued there until October, 1552, and then went to Pavia, whence he was invited to Bologna in 1562. He taught in this latter city until 1570, at which time he was thrown into prison for debt, but some months after was sent to his own house but was not restored to his liberty until some little time afterwards.

In 1571 Cardano went to Rome, where he lived without any public employment. He was, however, admitted a member of the College of Physicians in that city and received a pension from the pope. According to Thuanus, he died at Rome Sept. 21, 1575, while other historians place his death in 1576. Before his death he had the misfortune to witness the execution of his son charged with poisoning his wife.

From what precedes it would appear that Cardano was of a very fickle temperament, but one will have a much better idea of his singular and odd turn of mind by examining what he himself tells us, concerning his good and bad qualities, in his "De vita propria": "Nature has given me talent for manual work, a philosophical mind adapted to the study of sciences, full of taste, a good character, voluptuous, gay, pious, inconstant, friend of wisdom, inclined to meditation, inventive, full of courage, prompt, defender of good things, inventor of new things, an enemy of the *vox magistri*, of moderate habits, interested in everything related to medicine, zealous for miraculous things, architect, mocker, sober, industrious, laborious, diligent, only living from day to day, frivolous, never forgetting an injury, contemptuous of religion, envious, sad, traitor, setting snares, magician, enchanter, miserable, hateful, lubric, solitary, slightly sympathetic, severe, divine, jealous, lascive, obscene, obsequious, fond of conversation with elderly people, etc."

Besides this enumeration, he boasts in other parts of his writings of possessing qualities, perhaps it were better to say properties, of a hyperphysical nature, and he enters most voluntarily

into ecstasy. He makes objective the products of his imagination with such force that he says that he could see them, not with the eyes of the soul, but with those of the body. He was forewarned by dreams of everything that was to happen to him, and the future was indicated by certain marks which appeared upon his finger nails, as it occurred to him especially more forcibly at the time his son was imprisoned for his crime. Like Socrates, Cardano possessed an easy genius that he has defined in the dialogue entitled "Tetim"—"a venerable genius mixed with Saturn and Mercury."

Leibnitz, who was well versed in the merits and talents of Cardano, has said that he was a very great man with all his defects, and without them would have been incomparable. Cardano certainly occupies a more distinguished place in the history of the progress of philosophy and mathematics than in that of medicine, but he has composed a large number of works relating to the healing art, some of which are still possessed of much interest, and they certainly greatly contributed to break the chains of ancient Arabic Galenism. Cardano had as motto, "*Tempus mea possessio, tempus ager meus.*" He has justified the choice which he made in this selection, as is proven by the 222 treatises contained in the 10 volumes which compose his entire works, which are not even complete, and I will only mention here those treatises which directly apply to medical science.

"De libris propriis." Nuremberg, 1544.

"De libris propriis eorumque ordine et usu ac de mirabilibus operibus in arte medica factis." Lyons, 1557.

"De libris propriis eorumque usu liber recognitus." Bale, 1562.

"Contradicentium medicorum libri X." Paris, 1546; Lyons, 1548; Antwerp, 1564; Marburg, 1607. The first two editions are incomplete.

"De Sarza-Parilla," published with his "Contradicentia medica." Lyons, 1548.

"De subtilitate libri XXI." Nuremberg, 1550, and Paris, 1551. A fourth edition published at Bale in 1560 contains additions and a refutation of Scaliger's criticisms. Other editions have appeared. This is certainly Cardano's masterpiece, and it contains striking proofs of his great knowledge and superior intelligence, and also in many instances his puerility and want of system.

"De rerum varietate libri XVI." Bale, 1557.

"In Thessalicum medicum actio secunda." Bale, 1562.

"In septem particulas aphorismorum Hippocratis commentaria." Bale, 1564.

"De venenis libri tres." Bale, 1564.

"De methodo medendi sectiones tres." Paris, 1565; Marburg, 1607. The first two sections of this work were published for the first time at Venice in 1545 under the following title: "De malo recentiorum medicorum medendi usu libellus centum errores illorum continens. Item alius de simplicium medicinarum noxa."

"Podagrae encomium," in his "Opuscula medica et philosophica." Bale, 1566.

"De aqua" in the second volume of his "Opuscula medica et philosophica." Bale, 1566. In this same work will be found "Liber de vitali aqua, seu de aethere."

"Medicine encomium," in his "Opuscula medica." Bale, 1566. In the first volume of this work will be found "Ars curandi parva," and in the second volume will be found "De radice cina responsum petitioni M. Antonii Majoragii."

As to Cardano's works, their analysis is surrounded by the greatest difficulty, because on every page there is a want of order; there are contradictions, hesitations, repetition, in fact, their study is rendered very difficult. His medical

works comprise more than four volumes of his "Opera omnia," and are composed of a multitude of opuscles and short treatises which succeed each other without any order and are in no way related to one another. Upon reading them one is constantly reminded of the author's preoccupation to write in order to make the greatest number of pages, and he admits himself that he was paid by the page, and so made money by his prodigious knowledge. In spite of all these defects one cannot but see that he had a logical and lucid mind, that he was an observer.

He considers nature as the ensemble of things and beings, and the ternary division of the universe he admits, but he has reduced it to an entirely mathematical abstraction. He distinguished three principles in nature, namely, matter, which is the soul of the world, and whose principal function is movement and intelligence. Under its multitude of varieties matter is unique and eternal, two modalities of force constantly acting on it in order to describe the cycle of the four elements. The four elements are heat, which is the symbol of life, the humid, which represents inertia and inorganization.

All bodies are susceptible to movement and all have a vegetative soul. Intellect is one; it envelops all beings. "There is *sub luna* only one intellect, and this intellect is only human as far as human matter can admit it; it penetrates man and by so doing produces in him acts of intelligence. This same intellect surrounds the lower animals, but on account of the disproportion of matter, its entrance within them is prevented. Thus it illuminates the interior of man, and only sheds rays around the lower animals. There is no other difference in this intellect of men and that of beasts, and from this it arises that what is perfect in the human being is confused in animals." Cardano also admits the existence of an intermediary agent between the two worlds or the two extreme principles, namely, God and Matter. In order to designate it, he employs the same term of *spiritus*, which is already met with in Bacon, Arnauld de Villeneuve, and Cornelius Agrippa. In his "De usu ciborum" an entire chapter is given up to the study of this element, which serves as the link between the human body and the divine principle.

He also deducts important consequences in the medical point of view for the treatment of diseases which are inflicted by the *spiritus*.

As a disciple of the doctrine of concordances he admits that the poisonous action of things should be attributed to occult sympathies or antipathies, which unite the planets, living beings and men; and very logically he advises, besides a physical treatment, a kind of psychological cure. In another part he groups all the poisons—the word poison being taken in its most general meaning—as some arising in the human body and others coming from air and water of bad quality. A third group contains poisons properly speaking, while the fourth includes the venoms, some being entirely deprived of a material substratum; these

are the incantations, magic works (?) and philters. Others have a certain material substratum, as fascination, whose effect is produced by a visual emission. He is imbued with the idea that lower beings are in concordance with the superior, and believes in astrological medicine, and an entire passage in his book "*Contraicentrum medicorum*" treats of unfortunate days in the point of view of astrological medicine. And again, in this same book, he mentions epidemics that he attributes to the influence of the constellations.

In his pathology a very important place is reserved to those diseases produced by evils, and he describes the symptoms which are variable according to whether they relate to a fascination or a sortilege. He describes a person who is fascinated as having a whitish color of the skin, with a sadness in the eyes, crying often, suffering and sad. A person who has become ensorcelated is always exalted. He speaks much. The eyes are brilliant. The thoughts follow in rapidity. Sleep is absent and the subject emaciates in a few days.

Such are the theories which govern the medical science of Cardano, and consequently it is easy to foresee how very strange and marvelous would be his therapeutics. For the application of ordinary remedies, or physical means, one principle seems to dominate, namely, "*Similia similibus curantur*." In his "*De rerum varietate*" he says that nature is powerfully aided by similar things, and as an illustration he says that the milk of the ass, the uterus of the hare, or the testicles of the buck will greatly aid in the production of pregnancy. Further on he says that the contraries repel each other, as, for example, when blood has been separated from its serum and dried in the sun it will act as an hemastatic.

Being at the same time scientific and, perhaps, somewhat credulous, he mentions a number of marvelous cures, which he gives as authentic, and only uses his strongly critical mind for the discussion of explanatory hypotheses.

Among other passages there is one which is interesting because it shows us that from an experiment he undertook upon himself he endeavored to eliminate all causes of error. Laurentius Gauscus Cherascius, who was an empirical physician of Tours, had a most remarkable magnet which if a stylet was rubbed on it the instrument could afterwards be made to penetrate a limb without giving rise to any pain to the patient. Cardano heard of this and undertook the experiment on himself. It was successful, because he hardly felt the slightest pricking sensation, and but a drop of blood was seen in the wound. In telling of this experiment he examines all the hypotheses which could possibly come to his mind, in order to explain this prodigy by a deceit, and he only arrives at the conclusion that this magnet had a real efficaciousness.

Nevertheless, neither his logical mind nor his excellent critical judgment can prevent him from relating facts such as these: A man bitten by a mad dog ate a crust of bread, after having had the finger pierced three times, reciting each time

the five dominical orations for the five wounds of Christ. He was cured. Here is another: Charles Zenus, the Venetian, received a very severe wound of the knee which no remedy could cure. A physician applied a remedy on the other knee and the wound closed.

Here is a sample of Cardano's personal treatments: In order to cure a toothache, a porous body, such as certain barks or roots, should be placed between the thumb and index finger.

He also speaks of odontalgia, and it is interesting to note that he discovered by chance on himself a kind of magnetic process by which this kind of pain could be calmed, and I here give Durey's literal translation of this passage: "I had a violent toothache occurring in the last two teeth of the left upper jaw; the pain extended to the other teeth, the nose, the eyes, the ear; no remedy acted on it. I endeavored to separate the teeth with the right hand, without any other result than to increase the pain; finally, by touching lightly, with the left thumb, the external aspect of the most painful tooth, and with the index the internal part, the pain lessened, decreasing all the more the lesser I touched the parts. I have repeated this experiment more than twenty times with success, until all the pain had disappeared."

There is no doubt whatever but that the medical writings of Cardano were the means of throwing off the yoke of Galen's old system, as modified by the Arabians, or at least they contributed largely to this end. For example, his judgment is certainly excellent when he advises the examination of the urine, from which diagnostic signs could certainly be derived, and believing them to be very certain, he departed from the teachings of Galen and Avicenna. He very well appreciated the signs that could be drawn from black urine, and at the same time reproached Galen for his want of observation, and he pretends, contrary to Galen, that sediment in the urine is not, properly speaking, the immediate product of coction, and contradicts the ancient theory by saying that coction may occur at the beginning of even an acute disease.

It is to be regretted that Cardano took so little time in the study of anatomy, although in many parts of his works he strongly recommends its study. If he had had more extensive knowledge of the human body he would have been able to have pronounced himself in a more decisive manner upon certain objects of theory, and would not have rendered himself culpable of several very great errors. Among others, he upheld that the heart did not have a single nerve. He pretends that Averrhoës only placed the origin of the nerves in this organ simply because he was led into error by white patches which were occasionally present upon its surface, and by its substance, which is very similar to that of nerves.

In other parts of his writings he believes that the heart has a sensibility, and admits three different sensitive faculties. The first is complete, and is the result of influence of the nerves, consequently only slightly marked in the superficial

part of the heart and entirely wanting in its interior. The second is incomplete, and only occurs in a pathologic condition or in the tendons and ligaments which during health are deprived of all sensibility. The third is seated in the soul itself, in which the heart, which is the source of life, also takes an active part.

He very ably and precisely demonstrated that the various functions of the soul were localized in various parts of the brain, and he says that this opinion in no way influences the method of treatment.

The muscular fibres and the vessels are not attracted to each other, but are formed by attraction.

I would here remark that Cardano was fully aware of the discovery of Fallopius, but he did not fully seize its import.

He does not believe that putrefaction of the atmosphere is an etiological factor in contagious diseases, excepting when the atmospheric vapors become altered. Cardano upheld that mucous secretions coming from the nose and throat were not always derived directly from the head, and that very often they were produced by the organs of secretion located in the mouth and nose, so that in reality he preconceived the great truth which later was so convincingly demonstrated by Conrad Victor Schneider. He taught that the mucous secretions developed outside of the vessels, which then absorbed them and carried them throughout the economy in the circulation to different organs, and disproved the theory that the various humors developed directly in the organs themselves and are then exhaled by them into the cellular tissue. Cardano also says that it not infrequently happens that unsalted mucus turns into bile and that salted mucus may transform into atrabile.

Besides the various kinds of bile described by Galen, Cardano adds a number of others. He states that putrid fever is directly due to an overheating of the blood and to changes taking place in the humors which become separated from this fluid, because the blood itself can never undergo putrefaction. He upholds that the blood is imperfectly prepared in the liver but is perfectly so in the heart.

He mentions the fact that frequently after having observed all the symptoms and signs of phthisis during life, at autopsy the lungs will be found perfectly normal, or only presenting a few small tubercles.

His manner of relating the histories of some of his cases readily demonstrates that he has done so with no other end than to satisfy his vanity. As an example of this, he says that out of twelve physicians he was the only one who was able to discover a disease with which a certain countess was afflicted, the other physicians believing that she was pregnant, while Cardano demonstrated beyond a doubt that the patient was afflicted with a hydropsy of the uterus. In another instance Cardano was called in consultation with other practitioners, and he declared that the disease

was opisthotonos, and all his colleagues ridiculed him upon the dissonance of such a barbarous word, but he cured the patient completely by frictions with oil of chamomile, and mithridates. He also states that he has cured several cases of leprosy and phthisis, and in this latter affection he employed a dilute solution of sulphuric acid, powdered orris root, syrup of rose, and one or two other preparations.

Sprengel asserts that Cardano was afflicted with diabetes, and that for a time he daily voided 100 oz. of urine; and Cardano himself relates the case of another person afflicted with this disease who voided 36 lbs. of urine daily, although only 7 pounds in weight of food and drink were ingested.

Cardano's theories relative to the general effects produced by baths are most interesting, and he ardently combats the ancient Galenic indication of "*contrarie contrariis opponenda*." He points out that this law is not susceptible of having a general application because, for example, a diarrhea may be cured by purgatives. He also raises his voice against the ancient prejudice of giving wine to patients afflicted with fever, and he condemns the use of distilled waters which have neither taste nor smell, because they are not only useless, as they possess no predominant property, but they may even be deleterious on account of the metallic particles with which they are impregnated, and which are derived from the walls of the receptacles in which they are distilled. Cardano believes that it is unwise to administer light laxative medicines in the beginning of all acute diseases, and also that it is better not to defer blood-letting in these affections for too long a time, because this operation is one of the most important means by which we may moderate a too considerable afflux of the humors. He also believes that purgatives should be administered after the maximum of the disease has been reached, and that blood-letting is a most dangerous practice during menstruation, towards the decline of most all types of fever, and believes that this practice is, generally speaking, a salutary one.

He points out that blood-letting and blisters are not indicated in every case of apoplexy, and that paracentesis should not be performed in those cases where the fluid collection is due to a disease of the liver, when resource has not been had to other means and when congestion of the organ has slowly taken place.

Cardano knew without any doubt the curative virtues of metals, because he says that a thin plate of gold will prevent headaches if it be placed on the coronary suture. If placed upon the cardiac region it will calm palpitations, and will soothe the pains of nephrolithiasis when put in contact with the lumbar region. We have here an entire system of therapeutics, because it is to the power possessed by metals that he attributes the curative virtues of the seals and bracelets of the royalty. He believes that not only metals enjoy such properties, but that precious stones are also of value. Thus he states that jasper will control hemorrhage,

that coral is excellent for a weak heart, and that the sapphire will cure the plague.

The therapeutic virtues of gems and metals are only a particular branch of the doctrine of universal concordance. Gold has not in itself a value, but it is directed by the sun which infuses a part of its virtues into the metal. It is the same with silver, which is acted on by the moon; lead, which is influenced by Saturn, and copper by Mercury, etc. If this idea be analyzed it is easy to see that if the time is chosen at which the sun has its maximum of influence, the therapeutic strength of gold will be increased if applied at this time, and if it is placed on a part of the body which is submitted to the direct influence of the sun, and, still more so, if the subject has been born tributary to the sun, the action will be all the greater. From this example we see how all the occult theories on astrology and metallotherapy are intermingled. For example, seals do not act on account of the figures engraved upon them; their action is dependent on the accord established by the thaumaturge between nature, the composition of the seal, the course of the stars and the nature of the being to whom they are destined.

Cardano also was conversant with the procedures of cures produced by sympathy, as can be demonstrated by the following example, which he relates in his "*De rerum varietate*": In order to cure a quartian fever, all the urine voided by the patient during the attack should be mixed with flour and then scattered along the road with the hope that a hungry dog may devour it, and if this should come to pass the animal will contract the fever and the patient will be cured. Cardano also relates the following case: A patriarch, by name Castelnovo, suffered with toothache for three days, and this is the way he was cured by a sorcerer. The latter took a nail and with it wrote a few enigmatic lines upon a tablet, touched the diseased tooth three times with the nail, and then drove the latter into the tablet upon which he had written. The pain ceased immediately, and the sorcerer promised that it would never return if the nail remained stuck in the tablet, and in point of fact, for the 16 years that the patient lived afterwards, he never had a return of his toothache.

In his "*Contradicentrum medicorum*" Cardano says that for a long time it has been questioned whether enchantments could serve as therapeutic means, and he concludes that in certain cases they may be useful. Facts corroborating this had been recorded by Dioscorides, Aristotle, Avicenna, Avenzoar and others, and Cardano himself relates several, as, for example, where a man was in a most desperate condition on account of having been struck by lightning, and who was cured by inunctions made with oil and wool.

Cardano endeavors to scientifically explain these cures, and says that one should admit that there is in nature many things which remain enigmas, and it is only from time to time that an explanation may be given to them. On the other hand, in cases of cure such as these, one should

attribute a certain rôle to the influence of the imagination, which so frequently transforms the thoughts and sensations of man, and whose action is in many instances so rapid. And although this action may have been most insignificant it should, nevertheless, be still taken into account, because physicians know better than anybody else that very trifling causes will oftentimes produce very great and marked effects upon the human organism. He also believes that one should admit that the mind of one man may act on that of another by its proper force, by modifying the *spiritus* of the one upon whom he wishes to bring under his influence, and, thanks to this mysterious action, the individual undergoing the incantation becomes to a certain point the tool of the enchanter. Cardano also points out that similar facts may occasionally result from the action of the will of the individual upon himself. Certain people are especially endowed with a gift to influence others, because mental power varies in degree from one subject to another, and, in short, one should admit that magic operations are occasionally useful in medicine, and for this reason their employment should be allowed when the end to be obtained is to effect a cure. If they do not always succeed, that is no reason why the physician who employs them should be termed an impostor, because, like all forces, the one necessitated by the incantation may present oscillations, or even a complete cessation in an individual who oftentimes is in possession of this gift.

To quote further from the works of this brilliant mind would be interesting, and would carry us far beyond the intended limits of this short biographical sketch, but I have endeavored to show, in what has already been extracted from his writings, that Cardano was a great physician and observer of mankind. From the various works on medical history and from the original works of Cardano himself that I have been able in the past to consult, I cannot but think that he did not believe sincerely in the occultism and the mysterious magic in which his works abound, and that all that pertains to them was only written in order to increase the number of pages for which he was paid.

LYMPHATIC AND PORTAL INFECTIONS FOLLOWING APPENDICITIS.¹

BY JOHN C. MUNRO, M.D., BOSTON,

Assistant Visiting Surgeon, Boston City Hospital.

PORTAL or lymphatic infections, singly or combined, following appendicitis, are not so rare as many would have us believe. The obscurity of the symptoms, often insidious, at times fulminating, the difficulty in determining a lesion of the appendix, even when suspected, tend to confuse a group of symptoms already variable. In a paper published in the "*Proceedings of the Philadelphia County Medical Society for December, 1900*,"

¹ Four of these cases were contributed to the last series of the Boston City Hospital Medical and Surgical Reports.