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"VERITIES YET IN THEIR CHAOS" *

BY

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Thomas Hobbes, the philosopher, was a contemporary and familiar friend of William Harvey. Hobbes has described the life of man as "nasty, brutish, and short." He knew something both of life and of medicine. He had studied anatomy and read Vesalius in Paris; and he lived to the age of 90 by a health system of his own, and by keeping clear of doctors. A strong point in his system was exercise, and a favourite exercise was singing. This is described by Aubrey (*Lives of Eminent Men*): "At night when he was abed and the doors made fast, and was sure nobody heard him, he sang aloud (not that he had a good voice) but for his health's sake: he did believe it did his lungs good, and conduced much to prolong his life." Aubrey adds: "He seldom used any physiqe. He was wont to say that he had rather have the advice or take physiqe from an experienced old woman who had been at many sick people's bedsides, than from the most learned but unexperienced physician."

This story suggests the low state and repute of medical practice in 1602, when Harvey came back to London from Padua, like Portia, "a young and learned doctor." Yet he brought back with him from Padua the best medical science of that time. It was the system of Galen brought up to date: Galen's anatomy revised and added to by Vesalius and Fabricius; his physiology, hardly modified but brilliantly expounded by Fernel in his *Physiologia*. It was the physiology that specially interested the young Harvey, and that was to be his life-long study. There were the four elements and temperaments; the four humours; the three coctions; the three spirits derived from the three great organs—liver, heart, and brain. The blood, carrying nutriment to every part, flowed out and came back by the same vessels—veins and arteries: and the blood was also charged with innate heat. But almost nothing was known of the true function of the heart, lungs, brain and nerves, muscles, and digestion.

Although the human body with its great organs had been dissected for sixty years by the accurate standards of Vesalius, there was confusion and almost complete ignorance of how these organs worked. These humours and spirits and innate heat and the rest had truth in them; but they were dim shapes, "without form and void"; they were "medical verities yet in their chaos." And so pestilence raged, disease prevailed, and humanity suffered.

Medicine was a learned science, but it was impotent in practice.

Harvey's Two Masterpieces

Harvey's life-work lay before him, a stretch of more than fifty years. His professional success as hospital physician, trusted official in his college, and physician to the Royal Court was rapid and distinguished. But what was extraordinary and immortal was his work as a thinker and discoverer; and the fruits of his genius were given to us in his two books, *De Motu Cordis et Sanguinis in Animalibus* (1628), and *De Generatione Animalium* (1651), the one appearing in the middle, the other towards the end, of his working life.

In both books the subject of study was physiology, the working of the human and animal body; and Harvey's general aim was a revision of the physiology of Galen. He wished, in fact, to bring out a new edition of this part of Galen's vast encyclopaedia of medicine, and for this immense task he chose his methods carefully. His first object was to bring data to "the cognizance of the senses"; and he got these *sense*-data by anatomy—human anatomy, comparative anatomy in many kinds of animals, and experimental anatomy in living animals. Then, having got and verified his *sense*-data, he reasoned from them and tried to reach a physiological conclusion.

These famous Harveian methods seem to be paraphrased by Sir Thomas Browne, physician of Norwich and contemporary of Harvey, in a passage from his *Christian Morals*, the passage ending with the title of this address. "Fly not only on the wings of Imagination: join Sense unto Reason, and Experiment unto Speculation, and so give life unto Embryon Truths and Verities yet in their Chaos." Reading Browne's lovely prose and admiring the beauty and antique charm of the words, one can miss the depth and truth of his thought. For this passage exactly describes the methods used by Harvey in his *De Motu*. There is the evidence of *sense* given by anatomy and experiment; the use of inductive reason and the element of speculation as to the missing link of the capillaries. These four mental instruments used together in *De Motu* drew out of chaos into clear form the verity of the circular motion of the blood.

De Motu is a masterpiece, announcing a great discovery, and showing a method applicable to every field of medicine

*Oration given at the 155th Festival, Harveian Society of Edinburgh, on June 2.

and science. His second book, *De Generatione*, takes a lower rank in physiology. Here Harvey was dealing with more complex problems where his instrument of anatomy was not fine enough to give him the necessary *sense-data* (he needed the microscope); he overloaded his argument with speculation, and, flying "only on the wings of Imagination," he often went astray. But it is a classic, and in some ways is a greater book; it deals with bigger problems, and shows Harvey in a wider range as biologist and metaphysician.

Harvey's Unwritten Books

In the closing chapters of *De Motu* Harvey shows that he had in mind other problems than the motion of the blood and heart; these other problems covered the whole range of Galen's physiology. Years before *De Motu* was written he was studying the function of the lungs and the whole problem of generation. He had now shown by carefully chosen methods that the motion of the blood was a circulation. This discovery opened a wide range of new problems which he could examine and might solve in the same way. Harvey, impatient and irritable in the ordinary intercourse of life, showed in the writing of *De Motu* a firm mind disciplined and calm. But in the second last chapter the thought of his discovery raises him to an unusual excitement: "Finally reflecting upon every part of medicine, physiology, pathology, semeiotics, and therapeutics, when I see how many questions can be answered, how many doubts resolved, and how much obscurity illustrated, by the truth we have declared, the light we have made to shine, I see a field of such vast extent in which I might proceed so far and expatiate so widely that this my tractate might swell out into a volume which was beyond my purpose, but my whole life would not suffice for its completion." This was only a dream, and the great enterprise does not seem to have been seriously taken up.

But in *De Motu*, in the Two Letters to Riolan, and in *De Generatione*, he gives a list and names the titles of seven treatises which he proposes to write and for which he has already made experiments and collected observations. The list is: (1) On the Causes, Uses and Organs of Respiration; (2) On the Formation of the Foetus; (3) The Organs of Motion (Heart and other Muscles); (4) Medical Observations and Pathology; (5) The Loves, Lusts, and Sexual Acts of Animals; (6) Physiology and Particular Treatise on the Blood; (7) On the Soul and its Affections. The only one of the list to be completed was "The Formation of the Foetus," published as *De Generatione*. The other six unwritten books of Harvey's may be called his hyperaemic (unprolific) eggs, conceived in his brain, undergoing some gestation there, but never brought to birth. The one most nearly completed was his "Medical Observations and Pathology," which, he says in his First Letter to Riolan (1649), "I intend putting to the press," and which in *De Generatione* (1651) he hopes to complete, "if God grants me longer life."

This grand review of medicine and physiology which Harvey planned in these unwritten books was beyond his powers, because the means of acquiring the new knowledge were not available in his time. This rewriting of Galen's system of medicine and surgery was to be done not by one but by many men, written slowly page by page not in a single generation but over three hundred years; and the great volume is not finished yet. But about Christmas, 1650, Harvey handed over, rather reluctantly, to his friend, Dr. George Ent, the manuscript of *De Generatione*, and this great and strange book was published in 1651.

Harvey's Doctrine of the Soul

De Generatione contains seventy-two exercises on conception and development; and added essays on parturition, the uterine membranes and fluids, and his final theory of conception. But, mingled throughout, there is also much general biology, and, what is strange and disappointing to modern biologists, much metaphysical argument dealing with the soul. The book contains many references to his planned but unwritten treatises, and many passages showing his fine sense of poetry. It is an extraordinary book, interesting to read but not easy to understand, and it shows the range and depth of Harvey's mind. Even its mistakes, the mistakes of a great mind, are worth consideration. It made no substantial contribution to the physiology of development. But it firmly stated the doctrine of epigenesis as opposed to metamorphosis—a doctrine which was amply confirmed much later by Wolff and von Baer; and its influence upon the improvement of midwifery practice has been made clear by Professor R. W. Johnstone in his Oration to our Society two years ago. It again shows Harvey, as in *De Motu*, a great and accurate anatomist and a tireless and ingenious experimenter.

In it he reaches his full stature as a general biologist, dealing with all living creatures, man and animals, birds, fishes, insects, and plants—as Newton said of himself, "gazing at the ocean of being that lay before him." And for Harvey, in his study of being, there was something beyond biology, although joined with it. With this mysterious *beyond* Harvey's mind wrestled, and so in *De Generatione* Harvey passes from biology into metaphysics, and states his doctrine of the soul and the blood, of the soul in man and animals, and of the Soul of the Universe.

Harvey's mind and outlook were formed at Padua. Here he was trained in anatomy by Fabricius; he may well have heard the new teaching in physics by Galileo; and he came into deep contact with the towering mind of Aristotle ("master of them that know"), and read the Aristotelian treatises on biology, generation, and metaphysics. According to Aristotle and most of the great thinkers up to Harvey, there was in the living body something more than physical structure and physical process; and so alongside physics as a subject of study there lay metaphysics. Harvey had no shadow of doubt about this; and so he shows himself in *De Generatione* both as biologist and as metaphysician, and discourses again and again of the soul, how it is joined to the body, and how together they make up the lives of man and animals.

The Soul and the Blood

Harvey's final position was that the immediate link between soul and body was the blood. Throughout his life his mind was fascinated by the blood. In *De Motu* he had taken up and solved the path of the blood and the action of the heart in maintaining its circular course; and, following Aristotle, he at first gave primacy in the whole body to the heart, saying: "It is the heart by whose virtue and pulse the blood is moved, perfected, made apt to nourish, and preserved from coagulation and corruption . . . [it] is indeed the foundation of life, the source of all action." But in *De Generatione* he has changed the emphasis from the heart to the blood, and he now puts the blood in the first place. He did this because, in his study of the early development of the hen's egg, he was satisfied that the blood appeared before the heart and every other organ and part. This appearance was the famous *punctum saliens* of Aristotle. This first sign of animal life

in the 4-day-old chick as a red "leaping point" had been seen nearly two thousand years before by Aristotle, who named it *punctum saliens* and proclaimed it to be the heart of the embryo chick.

Harvey confirmed the observation of Aristotle, but with a significant difference. This is Harvey's vivid description, given in the first English translation of *De Generatione* (1653). "If therefore you observe on the fourth day, you will meet a great metamorphosis and wonderful alteration, which are more evident almost every hour that day long: about which time the Egg beginneth to step from the life of a Plant to the life of an Animal. For now the Limbus or hemme of the colliquamentum beginneth to blush and purple, being encompassed by a slender bloody line: and in the centre almost of it, there leapeth a capering bloody point [Aristotle's *punctum saliens*] which is yet so exceeding small that in its diastole or dilatation it flasheth only like the most obscure and undiscernable spark of fire, and presently upon its systole or contraction it is too subtle for the eye and quite disappeareth." After careful and repeated observation Harvey was convinced that the red line (the embryonic blood) appeared *before* the red leaping point, and he therefore now transferred to the blood the primacy in the life of the body. He puts his new view plainly: "The blood is the prime part engendered, and the heart the mere organ destined for its circulation."

Continuing his study of the blood, he next takes up the old doctrines of Galen of humours and many kinds of spirits working in the blood, and of the innate heat; and dismisses them all with scorn: "Nothing is more uncertain and questionable than the doctrine of the spirits . . . we have found none of all these spirits by dissection. . . . There is in fact no occasion for searching after spirits foreign to or distinct from the blood, to evoke heat from another source, to bring gods upon the scene, and to encumber philosophy with fanciful conceits; what we are wont to derive from the stars is in fact engendered at home; the blood is the only innate heat." With the ground cleared, he goes on to describe the powers and properties of the blood in relation to the soul and the processes of animal life. "It [the blood] is the common bond between soul and body: it is the immediate instrument and principal seat of the soul . . . it is the instrument of the Great Workman . . . it is to be regarded as the substance whose act is the soul or the life . . . it therefore comes to the same thing whether we say the soul and the blood, or the soul with the blood, or the blood with the soul, performs all the acts in the animal organism."

This is Harvey's doctrine of the soul and the blood. It replaces the many spirits and innate heat of Galen with one spirit, the soul, which performs through the blood all the acts of life. It does not tell how the acts of life are performed; elsewhere he says that these operations "are carried out with such foresight and divine intelligence which indeed surpasses our understanding, and are in no way to be penetrated by the dull edge of our apprehension." With him physiology has now ended and metaphysics has begun; unable to search out physiological *process* any further, he goes on to speak of *cause* in man and in the universe. The soul of man, interfused through his blood and body, is linked with and dependent on "the first cause of all things, by whatever name this has been designated—the Divine Mind of Aristotle, the Soul of the Universe by Plato, the *Natura Naturans* by others." In the same argument he turns to and quotes his beloved Virgil—"in the same way as in the greater world we are told, 'All things are full of Jove—*Omnia plena Jovis*,' so in the slender

body of the pullet, and in every one of its actions, the finger of God or Nature obviously appears."

This last sentence and many like it have the feeling if not the form of poetry, and show Harvey as poet as well as metaphysician. He did not express his thought in verse, but when he rises to the height of his argument he shows the true sense and quality of poetry. He combined anatomy and poetry—a strange combination. Anatomy divides, dissects, and looks at parts. Poetry looks at things undivided and whole, and, however small the thing is, in its widest relations. And poetry is also and essentially metaphysical. Its language is not that of metaphysics, for it uses words that are understood by all men, even the unlettered. In poetry deep is speaking unto deep; and this deep is the soul in man. The universal range and poetical quality of Harvey's thought are shown in this passage where he is speaking of the nesting of birds: "And it is indeed a thing most worthy of admiration to see these creatures selecting and preparing their nests with so much foresight fashioning and furnishing, and concealing them with such inimitable art and ingenuity, so that it seems imperative on us to admit in them a certain spark of the divine flame (as the poet says of bees)."

Fulfillment in Physiology and the Liquidation of the Soul

Three hundred years have gone since *De Generatione* was published. Harvey brought no more unfinished books to press, and died in 1657. In this long march of time, the medical *comœdia* has moved upwards, slowly but very far, from the inferno of unknown and uncontrolled disease in which it lay in Harvey's day; and this progress has been mainly due to the building up of physiology. The effort and achievement of one man are of little account compared with this gigantic task and the many who have helped to complete it. But Harvey was a Titan among men, both in his power of mind and in what he set himself to do. He gave the new physiology a splendid start in his discovery of the circulation, but beyond that he added little. Looking back, we can see the reason for his failure. He had to hand the two instruments of anatomy and the experimental method; and his anatomy, consisting of dissection, his trained eyes, and the occasional use of the magnifying glass, was not fine enough. But the range and penetrating power of anatomy were to be prodigiously increased by the gradual perfection of physics and chemistry. Optical physics soon produced the microscope, and much later the x ray; electrical physics; and the fine filter: all these inventions gave really a finer and deeper anatomy, put at the disposal of physiology. So also the perfection of chemistry, essentially a sublime anatomy, revealed the intimate and ultimate structure of cells and fluids and their components.

In the closing years of Harvey's life anatomy was becoming microscopical, and three years after his death Malpighi with his microscope saw blood flowing in the capillaries, and supplied the missing link in the circular chain of the blood. A few years later the microscope showed red corpuscles in the blood and spermatozoa in the seminal fluid. These were only the first fruits of a rich harvest to be reaped by the microscope: but these three discoveries all touched on, adding to or correcting, Harvey's work on the blood and generation.

About the same time, and in London, the new physics attacked the baffling problem of respiration. Boyle, Hooke, Lower, and Mayow demonstrated a new kind of "spirit" in the blood derived from the in-breathed air. This was called "igneo-aerial spirit," and after two hundred years

of further search it was isolated and named oxygen by Lavoisier. Innate heat and igneo-aerial spirit are akin in name and in nature: the one is the "embryon truth" of Galen; the other its further development, coming to maturity in the modern doctrine of oxidation and combustion. As for Galen's humours and spirits, the new chemistry has found the blood and body fluids to be teeming with humours, ferments, hormones, and spirits in greater numbers and complexity than Galen and Fernel imagined.

Harvey, you will remember, dismissed the doctrines of the spirits and innate heat, saying that his "dissection could show nothing of the sort." He emptied the old chaos of shadowy spirits, and into the void that was left he introduced the metaphysics of the soul, carrying out, through the blood, all the processes of life. The more perfect *dissection* of the microscope and of physics and chemistry has shown Harvey to have been wrong, and that Hippocrates and Galen have been justified by their modern children in physiology. The old Greeks were men of genius, and their guesses, vague and without form, were a dim foreshadowing of truth. Their doctrines, rejected by Harvey, were "verities yet in their chaos"; they have now come out of their chaos and stand in clear and delicate outline as chemical and physical processes. It is not beyond the mark to say that modern physiology is a new edition of the old Galen, revised, rewritten, and greatly enlarged.

Biology and Metaphysics

And how has it fared with Harvey's doctrine of the soul and the blood, and of the soul generally? We can see what happened to Harvey in his study of the blood. He was a profound student both of biology and of metaphysics. His instruments for the study of the blood and of biology in general were anatomy and experiment. But his instrument of anatomy was not fine enough; and, having got from it all that it could do, he took up metaphysics. This combination of biologist and metaphysician was now becoming dangerous.

Descartes, philosopher, brilliant amateur of physiology, and contemporary of Harvey, gave in his writings a firm warning that, in the study of man, the soul and the body, metaphysics and biology, should be kept apart. Since this warning was given most biologists have taken the lesson to heart and have fought shy of metaphysics. In their study of living bodies they have done what Descartes advised, and have used only physical methods, and have stated their results in strictly physical terms. In this concentration on physics and exclusion of metaphysics they have in three hundred years filled the void of Galen's physiology with a labyrinth of living processes, working under physical and chemical laws, and in so doing they have made the practice of medicine powerful and beneficent.

Indeed, biologists have gone beyond the lesson of the master. Finding the most intimate processes of life to be explained by chemistry and physics, and finding nothing else in life but chemical operations, they see no place in the living body for metaphysical spirit. They might well use Harvey's own words: "There is no occasion for searching after spirits . . . to bring gods upon the scene . . . to derive from the stars what is in truth engendered at home." Life, we are told, is a form of matter; and living matter is chemistry in action. The biologists have gained the whole world in physiology, and have lost the soul. Sir Charles Sherrington, in his deep, scholarly, and humane study, *The Endeavour of Jean Fernel* (1946), has concluded a fine commentary on the old physiology thus: "To-day physiology is chemistry and physics," and he calls for "the

liquidation" of the life-soul and the other forms of spirit on Fernel's list.

It seems a hard and severe sentence; but the biologists have an old-standing grievance against the metaphysicians, and are not prepared to show mercy on their doctrines. They say that the metaphysicians, meddling with biology, have retarded its progress. Harvey's activities as a metaphysician they pass over in silence, or with an expression of mild regret, because in his case there are extenuating circumstances in his great physiological discovery of the circulation. And it must be granted that Harvey in his studies of the blood and male seminal fluid was in serious error, and allowed his doctrine of the soul to usurp the place of physiology. But he made fundamental statements about the rational soul in man and the Soul of the Universe—statements which in this general form have been held by the great majority of mankind in all recorded time and which have been the mainstay of their thought and action. Is this great doctrine of soul or spirit now to go into liquidation?

This great question cannot be dealt with now; but, with Harvey's affirmations about the soul in our mind, it can be looked at in its broad significance and implications. It is more than a question of doctrine for debate between biologists and metaphysicians; it is of deep concern for all men in their daily lives.

Life Without Soul

This new, or rather old-new, theory of life without soul promises great benefits, but it seems to carry practical losses and risks. The biologist tells the ordinary plain simple man to forget the old fairy-tales about spirit and to accept the new and true chemical story about life, and the dialogue goes on:

Biologist: "The world, yourself, even your thoughts, all are a marvellous chemistry which has been operating the whole universe of things alive and dead, and for thousands of years past until now."

The Plain Man interrupts with a question: "Must there not be a great Chemist, who has made all this chemical stuff, and who directs this tremendous chemical operation?"

The Biologist: "That question raises the old hare of the First Cause, and I am not going to chase it. Such a question is beyond chemistry. In any case, you don't need a First Cause; and I can give you all you do need. As yet I can't make the stuff; but my power of destroying it gets greater and greater. I have come to know most of the secrets of the chemistry. So far as you are concerned, I am the manager; and if you do what I tell you I shall give you in abundance everything necessary for your life—every chemical need. 'But all this nonsense about spirit, you must cut it out of your life—to use a good chemical term, you must liquidate it.'"

The Plain Man: "About music; must I give up the spirit in my music?"

The Biologist: "There is a good story about an old man, Thomas Hobbes, who sang himself to sleep every night, singing out of tune and without spirit. His music was mainly chemical—noise and exercise, and for a chemical end—the promotion of his health, and yet his music without spirit helped him to live till the age of 90. Isn't that good enough?"

The Plain Man: "The loss of soul in music would be a heavy one for me. Another question: What about poetry, which means a great deal to me?"

The Biologist: "Poetry is full of soul-stuff too: its essence is spirit. Poetry would keep alive the false doctrine of spirit, and would have to be repressed or severely controlled."

The Plain Man: "This would be a dreadful loss. One more question: What about religion in the new chemical world?"

The Biologist: "Religion is a fairy tale which must be told no more, not even to your children. You are a grown man

now; and you can and must do without it. Religion must go: it has done you grievous harm."

At this the plain man drops his head and is silent.

The Biologist (continuing): "Only look at what I have to offer you in exchange for your soul. In the language of an old book which you seldom read and which is now obsolete, I will pull down your old barns and build you bigger and better ones; and I will fill them to the roof with 'goods' that our newest chemistry will provide—food, clothing, health, long life, ease, and pleasure. The loss of your soul is nothing to what you will gain."

The Plain Man: "What you offer tempts me. Many of us plain folk need these chemical goods badly. But the idea of life without soul frightens me; it would be so flat and cold and dreary, and it might be dangerous. We have always been told that our souls are the best part of us. And yet your best chemists have searched every corner of us, and have found no chemical trace of soul. Could it not be that soul is of different and non-chemical stuff, that if you used other long-tried non-chemical methods of search, at once and everywhere, within our bodies and without, you would find soul?"

Conclusion

To sum up: Harvey's discovery of the circulation of the blood was the beginning of a new chapter in physiology. It may be compared to the appearance of the punctum saliens in the 4-day-old chick; "like a spark darting from a cloud" (his own words), it was the first sign of new life in European physiology, and was followed in a kind of epigenesis by a succession of other discoveries. Much of what he wished to do he left undone; but his unfinished work has been brought to fulfilment by others, and the verities of physiology are now no more in their chaos.

As to his teaching on the soul, both his particular doctrine of the soul and the blood, and his general statement of the soul in man and in animals, and the Soul of the Universe—all this has been rejected by modern biology. But biology has not said its last word, and is struggling even now to find its own metaphysic on the question of cause. Meantime Harvey's general statement on the soul is worth setting alongside those of other great minds in ancient times. *The Book of Wisdom*: "The Spirit of the Lord hath filled the whole earth." Aristotle: "All things are full of Soul." Virgil: "All things are full of Jove." Last, Harvey, speaking as a biologist: "For, as the same intelligence or spirit which incessantly actuates the mighty mass of the Universe . . . so also is there a *vis enthea*, a divine principle, inherent in our common poultry."

At the third annual general meeting of the British Rheumatic Association held on September 28 it was reported that the association is now established as a national organization and a registered charity. It maintains helpful connexions with the Ministry of Health and regional hospital boards. As the result of these, spa treatment can now be authorized under the National Health Service by a consultant in rheumatism, and those who can find their own accommodation can be treated as out-patients in any hospital rheumatic unit, subject to the recommendation of their own doctor and a recognized consultant. To meet the difficulties of rheumatics in finding accommodation close to centres where they can get urgently needed treatment, the association has promoted the formation of a housing society with charitable status under the title of B.R.A. Homes Limited to provide accommodation on a voluntary basis. Another of its activities is to provide flatlets for the old and disabled rheumatics within a certain income group. This will make it possible to combine geriatric with rheumatic treatment, which recent experience shows can relieve pressure on hospital beds.

ANTICOAGULANTS IN TREATMENT OF CORONARY THROMBOSIS

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Adequate care for the patient suffering from acute coronary occlusion is one of the most urgent problems in present-day therapeutics. A disease which statistics prove to be on the increase, which is afflicting younger lives (Ryle and Russell, 1949), and which after 25 years' study can still be shown to have a mortality rate of 40% among hospital patients within the first six weeks, is a challenge that for too long has been neglected.

Myocardial infarction, the result of coronary artery occlusion, now constitutes a large part of cardiological practice. The exact incidence of the condition throughout the general population is difficult to assess. All grades of severity are encountered, from the most severe cases dying immediately or within a few minutes or hours from the onset, to the very mild which experience little upset and have no ensuing disability. It is therefore the moderately severe or the complicated cases which provide the greater part of hospital experience. Statistics gathered from the hospitals cannot be applied to the population as a whole, but in this disease they certainly indicate the course followed by the moderately severe case treated, as we believe, under the best available conditions.

A study of the literature indicates that the immediate mortality following myocardial infarction varies widely in different centres and perhaps in different hospitals in the same city. In Table I the mortality rate ranges from the

TABLE I.—Showing how the Mortality Rate Varies in Different Series of Patients in the First Few Weeks After the Acute Occlusion

Author	No. of Cases	Mortality %	Remarks
Levine and Brown (1928) ..	145	53	First attacks only
Conner and Holt (1930) ..	284	16	
Harrington and Wright (1933) ..	148	54	
Master <i>et al.</i> (1936) ..	267	17	4-weeks period
" (1937) ..	140	21	
Bland and White (1941) ..	200	19	
Levine and Rosenbaum (1941) ..	208	33	Young adults
Woods and Barnes (1941) ..	128	47	
Newman (1946) ..	50	78	
Katz and Mintz (1947) ..	572	22	Young adults; 4-weeks period
Yater <i>et al.</i> (1948) ..	866	52	
Wright <i>et al.</i> (1948) ..	368	24	

78% of Newman (1946) to the 16% of Conner and Holt (1930). Our current Edinburgh experience has been assessed from two series of hospital patients, the first being composed of 100 consecutive cases of coronary thrombosis observed during the period 1939–46, before the introduction of anticoagulants; their mortality rate was 43%. A second series of 84 consecutive patients, forming the present control group and observed concurrently with a similar number receiving anticoagulants, had a mortality rate of 41%. Through the courtesy of physicians elsewhere in

*Work done during the tenure of a Grocers' Company Research Scholarship, 1947–9.