

CHAPTER XIII

MICROZYMAS IN GENERAL

So much worldly success had fallen to the lot of Pasteur that he was little accustomed to checks from his contemporaries. There seems small doubt that his rancour against Béchamp was considerably increased by the latter's determination to safeguard himself against any plagiarism of his theories concerning the cell and its formative elements. If the microzymian doctrine, suitably disguised, could not be put forward as Pasteur's, so much the worse for the microzymas and all that concerned them. The standing that the renowned chemist had achieved made it easy for him to trample upon any scientific growth likely to overshadow his own achievements, and, with his extraordinary good luck, circumstances again abetted him.

The time had come when Professor Béchamp relinquished his important post at Montpellier in the hope of benefiting his country. His gifted young son, Joseph, who was proving a worthy helper in his researches, followed his example. The whole family, with the exception of the elder daughter, who in 1872 had been married to M. Gasser, moved to Lille, and dark pages began to be turned in the great worker's life-history. He no longer possessed the blessed gift of independence, which he had hoped to increase by his transfer to the north of France. He was perpetually interfered with by the priestly directors of the new house of learning, and what between worry and work his hands were soon so full that the time was opportune for his influence to be undermined at the Academy of Science in Paris, where, thanks to Pasteur, the very name "microzyma" was rendered almost anathema.

How contrary his destiny must have seemed to Professor Béchamp! At the period when he was finally shaping his remarkable and exhaustive explanation of the processes of life, disease and disruption, unexpected opponents arose in the shape of priests, uninstructed in science, whose narrow minds could only find irreligion and materialism in views that, had they possessed any discernment, they would have realised could have combated far better than any of the dogmas of Rome the atheism which at

that epoch was inclined to link itself with science. The "little learning," with its dangers, would have been revived by the deeper draughts of Béchamp's profounder teaching. But of this the Bishops and Rectors of Lille gleaned no idea in their complacent ignorance, and in diplomacy, perhaps, Béchamp fell far short of Pasteur. Subterfuge was impossible to him. He could not pretend that ignoramuses knew more than he did of the workings of Creation, and he made no attempt to defer to the bigoted clerics, since to do so would have savoured too much of bowing the knee to Baal. He was no opportunist, and the Creator he imaged, as portrayed by His marvellous works, outdistanced the anthropomorphic ideas of the priests as the God of the Israelites surpassed the crude man-made Philistine idols.

Worried though he was at every turn, the Professor continued to put into shape the conclusions derived from the ceaseless experiments he had undertaken at Montpellier and still pursued at Lille, regardless of all interruptions. The deeper he delved into the microzymian doctrine the better it seemed to him were the answers it gave to the puzzles of contemporary science.

One of Béchamp's earlier achievements had been a close analysis of the albuminoids and a consequent discovery of their variations. Instead of finding them alike in each of the innumerable species of living beings, the Professor and his collaborators found them everywhere different, so much so that they could put no limit to them. This variety they proved by those precise chemical tests in the making of which Béchamp seems to have so utterly outstripped his contemporaries. They found that not only did the albuminoids vary in different species, but also in the different organs of the self-same body. They thus found the differentiation between species and between the organs of the body to be due both to the individuality of the inherent microzymas and the dissimilarities of the albuminoids. For instance, in the hen's egg they showed the complexity of the albumens that constitute the white and explained a method of separating these, while from the yolk they isolated the specific microzymas. Dr. Joseph Béchamp, the Professor's brilliant son, took a prominent part in carrying out these particular researches. He showed by a close analysis of eggs of every description that none of the albumens contained in either the white or the yolk is identically the same as that found in the egg of any other species. He made clearer than before the error of substantial unity. A fact which his work made apparent is that even chemically a creature is what it is in

the very egg from which it issues, both by reason of the cytological elements and also the albumens. It had been thought that the albumen of secretions was the same as the albumen of the blood: not only did M. Joseph Béchamp discover this not to be a fact, but also that among those he isolated none possessed the same elementary composition as that of the serum. He showed that there exists a certain relation of cause and effect between the tissues through which the secretion passes and the nature of the albumens of the effusion. He thus disposed of Mohl's and Huxley's earlier views on the subject and of Claude Bernard's belief in a unique protoplasm. With his father he put forward manifold instances of the elemental differences between species. For example, they found that though the organisms of the mouth, that is, the microzymas, bacteria, epithelial cells, etc., resemble one another in form in man, in the dog, in the bull, in the pig, yet their chemical functions are very different. M. Joseph Béchamp showed that the microzymas even of the same gland in the same animal vary according to age and condition. His father demonstrated the similarity he had found in the structure of the pancreas to that of the parotis and the dissimilarity in their products; while the secretions of the parotis he found to be different in man, horse and dog. The great teacher explained that it is owing to the microzymas of allied species of animals being often functionally different in certain of their physiological centres that each animal has diseases peculiar to it and that certain diseases are not transmissible from one species to another and often not from one individual to another even of the same species. Infancy, adult age, old age, sex, have their share in influencing susceptibility to disease-conditions.

These researches of the School of Montpellier certainly seem to throw light upon the nature of infection and on the immunity constantly met with, in spite of alleged exposure, from all kinds of infectious maladies. The world might have been spared the propagation and inoculation of disease-matters, had the profound theories of Béchamp been followed instead of the cruder fashionable germ-theory of disease, which appears to consist of distorted half-truths of Béchamp's teaching.

Another special study of the younger Béchamp was to trace microzymas in the fœtus and in the organs of the body after birth, where by laborious experimentation he proved their varying multiplicity at different stages. He also showed the variations of their action in different organs—the placenta, liver, etc.—and

their variations of action at different ages, comparing, for instance, those of the fœtus with those of the adult, and demonstrating that no extraneous organisms could effect these changes. He also assisted his father in his researches on corpses, where the two Béchamps maintained that the inherent microzymas, apart from the assistance of foreign "germs," bring about decomposition. They taught that when the corporate life of a being is at an end, the infinitesimal organisms that originally built up its cells continue to flourish and by their life-processes destroy the habitat of which they were the upbuilders. In 1880 Joseph Béchamp, as indefatigable a worker as his father, demonstrated the presence of alcohol in tissues shortly after death and its disappearance in advanced putrefaction, when he considered it to be destroyed by a continuance of fermentation due to the very microzymas that had produced the alcohol in the first instance. Thus he explained the continued vitality of the organisms that had till lately vitalised the now inert corpse or carcass, and showed that "nothing is the prey of death; everything is the prey of life," to quote Antoine Béchamp's epigrammatic definition.

What a different future might have awaited the microzymian doctrine had life been spared to Professor Estor and to Joseph Béchamp, instead of both being cut off in the prime of manhood. But the inscrutable decrees of Providence dealt hardly with the great master. His patriotic work foiled by bigotry, his scientific discoveries stifled by jealousy, his collaborators struck down by death, which spared neither his wife nor the young daughter of whom the priests had robbed him, he finally made his solitary way to Paris to find his chief detractor enthroned as the idol of the public, his own genius almost unrecognised. It was a dreary outlook and might easily have daunted even a brave spirit, but Béchamp's will-power rose indomitably to meet the future, and, aided and quickened by his splendid health and vitality, spurred him on to fresh investigations. With increasing years his incessant work never abated and he persevered in searching the mysteries of life-processes. Up to 1896 he continued to publish articles on milk, its chemical composition, its spontaneous changes and those occasioned by cooking. He not only maintained his early idea of its inherent autonomous microzymas, but he showed the distinctive character of various milks, human, bovine, etc. He denied the popular belief in milk being an emulsion, but was of the opinion, in which Dumas concurred, that the milk-globules are vesicles of a cellular type, that is, furnished with envelopes which

prevent their ready solution in ether in the milk stage, and in cream are causative of the clotting.

The crowning achievement of Béchamp's laborious and persecuted career was the publication, when in his eighty-fifth year, of a work on *The Blood*, in which he applied his microzymian views to its problems, especially that of its coagulation. We cannot do better than quote Dr. Herbert Snow's summary in the *New Age* of the 1st May, 1915:

"It represents the blood to be in reality a flowing tissue, not a liquid. The corpuscles, red and colourless, do not float in a liquid, as is commonly thought, and as our senses indicate, but are mingled with an enormous mass of invisible microzymas—the mixture behaving precisely as a fluid will do while under normal conditions. They are each clad in an albuminous envelope, and nearly fill the blood vessels, but not quite. Between them is a very small quantity of intracellular fluid. These microzymas, in their albuminous shells, constitute the 'molecular microzymian granulations'—the third anatomical element—of the blood.

"Directly the natural conditions of blood-life cease, and the blood is withdrawn by an incision in the vessels, these molecular granulations begin to adhere to each other very rigidly. By this adhesion the clot is formed, and the process of coagulation is so rapid that the corpuscles are caught within its meshes before they have time to sink to the bottom, as by their weight they otherwise would do. Then we have a second stage. The albuminous envelope of the granulation becomes condensed and shrinks. So the clot sinks *en masse*, and expels the intracellular liquor. Finally, in the third stage, the corpuscles are crushed by the contracting clot, and the red yield their colouring to the serum without. There is no such thing as fibrin *per se*. 'Fibrin is not a proximate principle, but a false membrane of microzymas.'"

"There is much," adds Dr. Snow, "in this ingenious explanation of a difficult and hitherto by no means satisfactorily solved problem which seems to indicate, at any rate to the present writer, that it is worthy of far closer examination and consideration than it would appear to have received . . ."

But surely that is only what may be said for the whole of Béchamp's microzymian teaching, which in its pathological relationship we can, from his writings, sum up as follows:

The microzyma is that which is primarily endowed with life in the organised being and that in which life persists after the death of the whole or in any excised part.

The microzyma being thus the fundamental element of corporate life, it may become morbid through a change of function and thus be the starting-point of disease.

Only that which is organised and endowed with life can be susceptible to disease.

Disease is born of us and in us.

The microzymas may undergo bacterial evolution in the body without necessarily becoming diseased.

In a diseased body a change of function in the microzymas may lead to a morbid bacterial evolution. Microzymas morphologically identical with and functionally different from diseased microzymas may appear without a microscopic distinction being possible.

Diseased microzymas may be found in the air, earth, or waters and in the dejecta or remains of beings in which they were once inherent.

Germ of disease cannot exist *primarily* in the air we breathe, in the food we eat, in the water we drink, for the diseased micro-organisms, unscientifically described as "germs," since they are neither spores nor eggs, proceed necessarily from a sick body.

Every diseased microzyma has originally belonged to an organism, that is, a body of some sort, whose state of health was reduced to a state of disease under the influence of various causes, which determined a functional change in the microzymas of some particular centre of activity.

The micro-organisms known as "disease-germs" are thus either microzymas or their evolutionary bacterial forms that are in or have proceeded from sick bodies.

The microzymas exist primarily in the cells of the diseased body and become diseased in the cell itself.

Diseased microzymas should be differentiated by the particular group of cells and tissues to which they belong rather than the particular disease-condition with which they are associated.

The microzymas inherent in two different species of animals more or less allied are neither necessarily nor generally similar.

The microzymas of a given morbidity belong to one certain group of cells rather than to another, and the microzymas of two given species of animals *are not susceptible to an identical affection*.

Such, roughly summed up, are the propositions that form Béchamp's basis of pathology. Needless to say, he put none

forward as an untried theory: each was founded upon exact experimentation and observation.

In spite of the hold of Pasteurian dogma over the Medical Faculty, scientific minds here and there confirm fragments of Béchamp's teaching, without knowledge of it, from their independent studies. In this connection may be quoted the evidence before the Royal Commission on Vivisection¹ of Dr. Granville Bantock, whose great reputation needs no comment.

"Bacteriologists," he said, "have discovered that in order to convert filth or dead organic matter of any kind into harmless constituents, Nature employs micro-organisms (or microbes) as her indispensable agents . . . In the modern septic tank it is the action of the micro-organisms, whether aerobic or anaerobic, that dissolves the sewage, and it is the continuous action of these microbes that converts all manurial matter into the saline constituents that are essential for the nutrition of plant life." After several examples Dr. Bantock continued: "The microbe in its relation to disease can only be regarded as a resultant or concomitant"; and after quoting many instances of error of diagnosis through reliance on bacterial appearances he quoted: "Is it not therefore reasonable to conclude that these micro-organisms . . . are certainly *not* causative of disease?" He also said: "I am bound to accept as a matter of fact the statements made as to the association of the 'Loeffler bacillus' with diphtheria; but to say that their presence is the *result* of the disease appears to me to be the more sound reasoning."

Then, again, we may quote the practical observations of the great pioneer of nursing, Florence Nightingale.

"Is it not living in a continual mistake," she said² "to look upon diseases, as we do now, as separate entities, which *must* exist, like cats and dogs, instead of looking upon them as conditions, like a dirty and clean condition, and just as much under our own control; or rather as the reactions of kindly Nature against the conditions in which we have placed ourselves? I was brought up by scientific men and ignorant women distinctly to believe that smallpox was a thing of which there was once a specimen in the world, which went on propagating itself in a perpetual chain of descent, just as much as that there was a first dog (or pair of dogs), and that smallpox would not begin itself any more than a new dog would begin without there having been a parent dog.

¹ Report of the Royal Commission on Vivisection, Q. 14,545-6 of the 4th Report, 1906, p. 77b.

² Notes on Nursing, p. 19 (note).

Since then I have seen with my eyes and smelt with my nose smallpox growing up in first specimens, either in close rooms or in overcrowded wards, where it could not by any possibility have been 'caught,' but must have begun. Nay, more, I have seen diseases begin, grow up and pass into one another. Now dogs do not pass into cats. I have seen, for instance, with a little overcrowding, continued fever grow up, and with a little more, typhoid fever, and with a little more, typhus, and all in the same ward or hut. For diseases, as all experience shows, are adjectives, not noun substantives."

It was she who said also: "The specific disease doctrine is the grand refuge of weak, uncultured, unstable minds, such as now rule in the medical profession. There are no specific diseases: there are specific disease-conditions."

Such was her teaching based upon far-reaching personal experience, upon opinions that are understandable in the light of Béchamp's microzymian doctrine, which thus gains confirmation from Nature's every-day lessons. It seems that causative disease-entities must give place to disease-conditions following upon bad heredity, bad air, bad food, vicious living and so forth, and, provided our ancestry be good, our surroundings sanitary and our habits hygienic, our physical status lies chiefly in our own keeping, for good or evil, as our wills may determine. Instead of being at the mercy of extraneous enemies, it rests principally with ourselves whether our anatomical elements, the microzymas, shall continue on the even tenor of their way, when our conditions will be those of health, or, from a change of environment in their immediate surroundings, develop morbidly, producing bad fermentative effects and other bodily calamities. Thus, while our own shortcomings are first reflected on them, so their ensuing corruption afterwards revenges itself upon us.

It has been argued in answer to Miss Nightingale's sound reasoning that she was only a nurse and therefore not qualified to express medical opinions. This objection comes oddly from the devout adherents of men, such as Jenner, who bought his medical degree for £15, and Pasteur, who managed to obtain by a majority of just one vote a place among the Free Associates of the Academy of Medicine! Let us, however, turn to the opinions of two genuine medical men and see how exactly they bear out the views of the great nurse. In the eighteenth chapter¹ of *The*

¹This chapter no longer appears in the work, but was formerly to be obtained separately from George Allen & Unwin, Museum St., London, W.C.

Wonderful Century, a work by the great scientist Professor Alfred Russel Wallace, we find that he quotes the medical statistician, Dr. Farr, and Dr. Charles Creighton, greatest of epidemiologists.

"In his (Dr. Farr's) Annual Report to the Registrar-General in 1872 (p. 224) he says: 'The zymotic diseases replace each other; and when one is rooted out it is apt to be replaced by others which ravage the human race indifferently whenever the conditions of healthy life are wanting. They have this property in common with weeds and other forms of life: as one recedes another advances.' This substitution theory is adopted by Dr. Creighton, who in his *History of Epidemics in Britain* suggests that plague was replaced by typhus fever and smallpox; and, later on, measles, insignificant before the middle of the seventeenth century, began to replace the latter disease."

It is interesting that the replacement of disease-conditions noted by Florence Nightingale in unhealthy huts or wards, according to their changing degree of unhealthiness, exactly bears out what Dr. Charles Creighton shows to be the testimony of historic records. And this evolution or retrogression, as the case may be, of disease-conditions is surely explained by Béchamp's microzymian doctrine, which teaches that upon the anatomical elements, whether called microsomes or microzymas, the actual builders of the body-cells, depends our state of well-being or otherwise, and that a morbid change of function in these may lead to disease-conditions in us, the latter altering as the former varies, and the former influenced by surrounding conditions, whether insanitary or unhygienic.

If the microzymian teaching thus sheds light upon zymotic mysteries, how much more upon hereditary tendencies, too much overlooked by modern medical orthodoxy. Since the microzymas perpetuate life from parent to child, so they carry with them parental characteristics for good or evil which may lie dormant throughout generations or be made manifest, according to the microzymas that carry the preponderating influence, thus explaining the Laws of Mendel. Yet again, disease-conditions due to abnormal growth, of which cancer is an obvious example, seem to bear out Béchamp's doctrine that upon the status of the microzymas depends the status of the whole or any part of the corporate organism.

In place of the modern system of treating that phantom shape, a disease-entity, and trying to quell it by every form of injection, scientific procedure on Béchamp's lines will be to treat the patient,

studying his personal idiosyncrasies. For these depend upon his anatomical elements, the microzymas, which, according to Béchamp, build up his bodily frame, preserve it in health, disrupt it in disease, and finally when the corporate association is ended by death these, with or without extraneous help, demolish their former habitat, themselves being set free to continue an independent existence in the earth, the air, or the water in which they happen to find themselves. Any morbidity which may be in them or in their evolutionary bacterial forms is quickly dispelled by fresh air. And since the microzymas of different animals, different plants and different organs—lungs, kidneys, colon, as the case may be—are themselves all different, so will there be variation in their bacterial development, and so the innumerable forms of bacteria perceived everywhere are readily accounted for. As the British Empire, or the United States of America, or the Republic of France is composed of innumerable varying individuals, so the corporate body of plant or animal is an association of living entities; and as the work of myriad individuals composes the life-processes of the nation so the action of the microzymas constitutes the life-processes of all corporate beings.

What might not the new outlook on life and disease have been had Béchamp's belief been developed instead of stifled under the jealousy of a rival!

And now we will turn to some modern views that seem to bear out his teaching.