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PRESIDENTIAL ADDRESS ON IMAGINED DISEASE; BLOCKING OF THE BRAIN'S ACTION.

Delivered at a Conjoint Meeting of the East Anglian, Cambs and Hunts and South Midland Branches.

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WHEN the Council of the Cambridgeshire and Huntingdonshire Branch of the British Medical Association did me the honour of electing me president of the Branch, entailing as it did in this case the distinction of presiding over the meeting held conjointly with the East Anglian and South Midland Branches, I felt very seriously the responsibility of selecting for your consideration some subject which lies within the field of my own work and yet may have an interest for those who, unlike myself, are engaged in the practice of their profession.

The maladies which I hope to discuss lie upon the border line of medical practice. They interest the psychologist as much as the physician. They interest—and this is the reason for which I venture to claim your attention—everyone who studies the nervous system in even its simplest structural and functional aspects.

When the histological structure of an organ departs from the normal type, local symptoms originating in the organ and constitutional symptoms due to the disturbance of the equilibrium of the whole organism make their appearance. If the part affected is—to use an indeterminate expression—the higher brain, however difficult it may be to identify the structural aberrations, mental disturbance, mania is the inevitable result. How are we to classify those departures from harmonious action in which the transmuting machinery remains intact but yet appears to produce abnormal results owing not to any defect in it, the central mechanism, but to the disturbing influence of abnormal stimuli; in which the body remains capable of doing all that a healthy man can, and yet for some cause—a cause which may perhaps be removed by a word, a breath, a fancy—the wheels remain locked, and neither the patient nor his physician can induce the machine to meet the most ordinary requirements of every day life? Collectively these cases make up a large class, the study of which belongs to the physician rather than to the psychologist, for the phenomena pertain neither to the intellect nor to the emotions of a healthy man, of a man that is to say whose mind reacts logically to external circumstance. For some years, when quoting such cases as illustrations of nervous action, I have used the expression physical mania, allowing a very technical meaning to the latter term, and this is perhaps justifiable, for they resemble in many particulars the various forms of mental disturbance, and yet the mind remains perfectly clear.

I should like to go still further, and divide this class into two groups: (1) that comprising cases in which the abnormal output of the central nervous system depends upon organic sensations, stimuli which arise in the organs of vegetative life, and fail as a rule to awaken consciousness; and (2) the group of cases to which this paper is devoted, in which the

abnormal action is due to impulses of intracerebral origin, which impede, enhance, or distort the commands of the will. The first group includes the many manifestations of hysteria, to which I would like to add all those physical and mental departures from sane action—all those cases in which the stimulus *A* from the outer world fails to produce, when reflected through the central nervous system, the logical effect *B* because some other stimulus *C*, arising within the body, is blended with it—no matter in what organ the interfering stimulus originates. I should like to stretch the group—perhaps physicians would even allow the application of the term “hysterical” to all the cases—until it included on the one side the paraplegia dependent upon irritation of the ovary or the bladder, and, on the other, even the mental inconsistencies due to a loaded rectum. Few men are quite themselves when they rise in the morning; most of us take an illogical, usually a depreciating, view of our surroundings and ourselves before the post-prandial pipe has done its benignant work.

An attempt to define Class 2 would carry me far beyond the limits of this paper and your patience, but it includes the cases with which I wish more particularly to deal—cases which have been described under the definition “paralysis dependent upon idea.” Nor do I wish to be understood as believing that sharp lines of demarcation separate the commonest hysteria from a fancied paralysis, or an inability to make arms and legs obey the will from a genuine delusion. On the contrary, I wish to urge that common phenomena characterise all these conditions, and that, up to a certain point, all are susceptible of a common explanation.

The literature of this subject is neither extensive nor important, although incidental mention of ideal paralysis is to be found in most systematic works. The most important paper which I have been able to find is one published by Dr. Russell Reynolds in the BRITISH MEDICAL JOURNAL for 1869. Dr. Reynolds is interested chiefly in the diagnosis of imagined paralysis from paralysis due to organic disease on the one hand, and from consciously simulated paralysis on the other. Beyond this there is little for the physician to say; he can narrate cases which have come under his own observation; he can point out that treatment must take the form, not of medicaments, but of an intellectual struggle with the patient's notion; the result will depend upon the tact and ingenuity with which the treatment is carried out. It is more likely to succeed under the favourable conditions which obtain in a hospital than when the doctor has to manage, not only the patient, but also the patient's friends.

The diagnosis in these cases is extremely important, but usually easy, I imagine. There is a combination of paralysis and power of movement. For movements which the patient recognises as important, and upon which he therefore concentrates his attention, the paralysis may be absolute, while only the physician recognises certain forcible well-directed movements of which the patient is apparently unconscious. There is no impairment of sensation or alteration in reaction to electricity. Reflex actions are normal. Nutrition is unaffected, showing the constant protective movements by which injurious pressure is escaped. There are no bedsores, nor do the muscles atrophy to a greater extent than would necessarily result from disuse. In short, there are no indications of central disease, and I need hardly point out the necessity of making sure that all indications of nervous disease are absent. The physician stands upon delicate ground, and may be guilty of grave injustice if he fails to withhold his judgment in the presence of a single doubtful symptom. From a physiological standpoint there must be the widest difference between a hysterical paralysis in which, owing to some cause affecting the central nervous system from below,

reflex action and even the excitability of the muscle to electricity are depressed, and imagined paralysis, which, so to speak, affects the central nervous system from above, in the total absence of any indication of disease. In the former case it is true that a volitional impulse of unusual force may break its way through to the paralysed limbs; but to attempt to generate such an impulse by rough mental treatment, which may be more than justifiable in imagined paralysis, is cruelly unjust in the presence of clear indications of functional disturbance in the lower part of the spinal cord. But it is neither the diagnosis nor the treatment which interests me, and I must ask you to forgive me if I show a certain timidity in dealing with the medical aspects of this class of cases. My interest lies in their explanation, and this I wish to reach, or rather to approach, so far as may be, from the experimental side.

The student of the nervous system needs to overcome many prejudices, for he first begins to look into himself when well acquainted with the complexities of his environment. In his brain he expects to find a microcosm in which are pictured all the manifold productions of its own activity in the outer world. Very gradually does he shake himself free from the illusion that the machinery of the mind is as complex as its products. Only after a struggle does he realise that, although he may use the highest powers of the microscope and the latest discoveries in histological method, he can find in the central nervous system nothing but cells and their processes. Of the processes, some are long, and termed "fibres." They serve to convey the impulses through a long trajet without subdivision, and special arrangements are made by their wrappings for the insulation and nutrition of the conducting strand. There is no essential difference between the fibres which carry impulses out to, and those which carry them in from, the periphery, down or up the central axis. The other processes ramify within the axis soon after leaving the cell. Thus is constituted the network which serves to distribute afferent impulses along efferent paths. Up to the present time it has baffled histologists to say how these protoplasmic processes unite with one another, but such a union is a psychological necessity. I have elsewhere suggested that the naked protoplasmic processes may have possibly a considerable power of extension and withdrawal, their molecules arranging themselves in lines under the influence of the nerve impulse; but such a provisional hypothesis is merely formulated for the sake of explaining the fact that, despite the extraordinary improvements made in histological method during the last few years, the existence of the network cannot be demonstrated. The processes branch until they are lost in what seems to be a common homogeneous ground-substance.

Nerve fibres, cells, network make up the central nervous system. The cells are grouped together at the points in the axis from which the fibres come off, and their size bears some relation to the size of the fibres over whose nutrition they preside; but the centres—the little offices filled with clerks busy receiving and transmitting messages, for which anatomists, whose minds were filled with ideas of organisation based upon commercial life, looked until recently—are nowhere to be found. Anatomical study throws no light upon the manner in which the system works, or rather, I should say, it does not throw the light upon the subject which used to be expected. So, too, the physiologist finds that the phenomena exhibited by the nervous system in action are, so far as he can investigate them, of the simplest kind. Reflex action, transmission of impulses along lines of least resistance, delay in the passage of the impulse directly proportional to the distance it has to travel, and inversely proportional to the openness of the track, which last, in its turn, depends upon the frequency with which it has been used in the individual and in his ancestors. Such is our knowledge of the fundamental functions of the nervous system, which increased research has done but little to elaborate.

Let me explain myself by an illustration. The movements most frequently performed are, probably, the movements by means of which the position of the body is adjusted, the contractions of the muscles which regulate the amount of flexion and extension of the joints. Instead of our muscles being, as one is apt to suppose, in a condition of absolute rest when they are not consciously set in action, they are, as the so-

called thought-readers have shown us, in a condition of almost perpetual movement. The hand appears to ourselves steady, but the hypersensitive thought-reader detects vibrations, from the variations in which he gains information as to the state of our emotions. When the nervous system is depressed or fatigued the rhythmic movements become obvious enough to ourselves.

The maintenance of the erect position is due to the ceaseless antagonism of the flexor and extensor muscles of the legs, of the gastrocnemius and soleus on the one side, and the quadriceps extensor cruris on the other. As the body sways forwards the gastrocnemius is stretched; the stretching acts as a stimulus, which brings about a reflex contraction of the muscle, and the body is brought back again to the upright position. In the same way stretching of the quadriceps generates impulses which lead to the reflex contraction of the muscle and the swaying of the body forwards. The nerve routes along which these adjusting impulses travel are the most open in the body. Afferent and efferent tracts are in continuity. There is no delay in the grey matter. The "patellar reflex" follows so quickly upon the blow given to the ligamentum patellæ that some physiologists have even failed to recognise it as a reflex action at all.

The patellar or rectus reflex can be demonstrated in most healthy people. It is so well known and easily called into action that we are apt to forget that it is but an example of a group of reflex actions, and that the ankle, the wrist, the elbow, the jaw are controlled by similar mechanisms, for the other tendon reflexes can only be exhibited in the same excessive form as the knee-jerk when the nervous system is diseased.

From these most reflex of all reflex actions to actions which are apparently voluntary stretches a series of gradations. The same plan holds good for all. Reflex action is the key to the physiology of the central nervous system. Imagine the afferent impulse delayed, combined with other reflexes, associated with dormant impulses, and a glimmer of light begins to fall upon the elementary phenomena of mental activity.

In the case of the knee-jerk, another phenomenon which plays a most important part in nerve physiology can also be demonstrated, namely, the influence which the passage of one impulse or one reflex action has upon another. This phenomenon is important in nerve physiology; still more important to the explanation of mental activity. The molecules of the central nervous system are never at rest; impulses are ceaselessly passing through it: its protoplasm is perpetually rippling under the influence of forces which react upon the body from the outer world. Further than this, the currents of nerve force which pass through any part influence the activity of all the rest. The knee-jerk affords us a singularly good opportunity of studying the dependence of one reflex action upon the condition of activity of the rest of the central nervous system, for although in this case the reflex route appears to be singularly well defined and independent, an impulse can hardly pass through any other part of the system without modifying the knee-jerk. As Jendrassik was the first to show, the mere act of clenching the fist at the moment when the tendo patellæ is being struck suffices to cause an exaggeration of the knee-jerk. If, however, the muscular movement is made from half a second to two seconds before the tendon is tapped, the jerk is reduced instead of being reinforced.

This is merely a type of many reflex actions which might be quoted as showing that no part of the central nervous system works by itself, but, on the contrary, its activity is influenced by the events occurring in every other part of the system, however distant.

In the case just quoted, the influence takes the form of exaltation, but many qualifications are necessary before this is accepted as a direct result. Commonly, then, one impulse restrains, diminishes, or inhibits the other. If the finger is placed upon the pulse while a glass of water is being swallowed, it will be found that during the passage of the swallowing reflex the cardio-inhibitory impulses are cut off; the pulse is quickened. In fact, the cerebro-spinal axis is worked upon the "block system." Its molecules are never still; activity in any part affects the movements in all the rest; the passage of one set of impulses is accompanied by the blocking of neighbouring routes. It is for the sake of bring-

ing into prominence this aspect of nerve activity that the foregoing fragment of physiology has been introduced; for this conception of blocking may help us perhaps to realise the nature of the mental disturbance which causes the appearance of fictitious paralysis; for while we look into our own consciousness for evidence as to the manner of working of the mind, the scaffolding upon which we apply the conclusions derived from introspection must be obtained from a study of the nervous system in its most primitive aspects.

The case I am about to describe is such an one as most men have met in the course of practice, but it happens that I have watched it with intense interest for several years. I have been on the look out for other cases which might in any respect resemble it. Any facts which came to light in my work upon the nervous system have been applied to its elucidation.

The subject is a man of remarkable health and muscular strength, of powerful intellect and prodigious memory. The world would have been at his feet had he been blest with a little of the energy and strength of purpose which brings success to many a weaker man. If it had been possible for him to become engrossed in his business, and to lose himself in a desire to work out ideas, an active and enjoyable old age would have been his. It is unnecessary, however, for me to weary you with an analysis of his mental characteristics except so far as they show a predisposition to this malady. To state that he was timid, averse to exertion, inclined to postpone decisions, emotional, would give a false impression of his character, unless it is understood that the good and endearing qualities are not mentioned as being immaterial to the history of the case. Although few men have lived so free from pain, he was always interested in stories of illness. At 67, six years ago, he has a slight apoplexy, falls, is aphasic for a few days; recovers with a slight feeling of numbness or "wooliness" in the lip and right hand. Upon these trifling disorders of sensation his attention is constantly centred. He persuades himself that he is losing power, becoming paralysed. For six years he has assured me at every meeting that he is weaker than he was when I saw him last. Although he measures seventeen inches round the calf, and has muscles which feel when set as firm as oak—although his patellar reflex is quite normal, and every function of the body is performed like clockwork—although I have seen him when his attention was distracted perform actions which required considerable muscular strength and some agility, he sits still in his bedroom day and night, or shuffles along to another room upon the same floor with much show of needing help.

To speak of this as a case of shamming would be to libel, cruelly to libel, a most upright man. He cannot use his limbs with freedom because he believes he is paralysed. It is disease by mental suggestion. What treatment can one adopt? If doctors had plenipotentiary power to do the best for the patient, a lighted match deftly dropped on to the skirts of his nightshirt just as one was leaving the room would undoubtedly produce the best results. It is a mistake to dismiss such cases as instances of conscious deception even when, as in another case which came under my notice, the desire to walk became so irresistible, that the patient was known to have left his bath chair on the sly and to have "stretched his legs." It is no more shamming than is the anger or despondency which may under suitable conditions overtake the most happy tempered amongst us shammed, because it does not bear a just and logical relation to the circumstances by which we are surrounded.

It is my object to try and link this *blocking by emotion* with other every-day instances of blocking, and to show that it is merely an exaggeration of a normal neural function. Let me give one other instance, which stands, as it were, midway between those which constitute disease and ordinary healthy control of actions by emotions.

It happened to me once at the seaside to see a girl who was bathing and had wandered some 50 yards from the shore on to a sandbank—overtaken by the tide. The water was too deep for her to walk back to the shore; it filled her chest, and, before anyone realised that she was in difficulties, she was floating insensible face downwards. Her father had been bathing with her, but had already entered his machine. He ran down the steps and, holding his towel in front of him, shrieked to the people on the beach to save his child, but,

although a good swimmer—although, as he told me afterwards, he loved this his only child so dearly that he could not have lived had she been drowned—he made no effort to rescue her. Why not? because he had taken off his bathing drawers.

The sentiment of modesty in this man—a clergyman—was so strong that it blocked the most urgent impulses to movement, backed, as they were, by parental love.

It would be easy to multiply anecdotes of this kind. It is tempting to treat the subject from a psychological standpoint, but I wish to suggest for your consideration an explanation of many of the phenomena of mental life, both normal and morbid, without leaving the domain of elementary physiology.

The central nervous system is an aggregation of similar elements or couples. Action is in origin reflex, that is, the transformation of an afferent into an efferent impulse. The character of the reflex depends, not only upon the nature of the stimulus, but also upon the number and character of the impulses which are passing through other parts of the nerve network at the same time. This is true, whether the impulses are originating without the body at the moment—concurrent sensations—or are awakened sensations, memories, emotions, and thoughts.

Life is the overflow of sensations into action. A sensory impulse which breaks upon the nerve network may pass straight across a well-defined well-beaten track, as in the case of the impulse which leads to the knee-jerk, or it may be distributed through a large number of strands of the plexus, awakening memories by which it is reinforced in some respects, checked in others, combined, disparded, and finally woven into a product which bears no visible resemblance to the factors out of which it is formed.

The influence of training is, in the main, to set going impulses which check.

In the child action is the immediate obvious result of stimulus. In old age the nervous system reacts less vividly. The afferent impulse does not merely break across its appropriate reflex path, but is unduly modified by emotion.

Accumulated experience hampers action, disturbs the logical reaction of the individual to his environment. The want of control which marks the decadence of mental power is really undue control; a preponderance of the secondary over the primary impulses. The individual no longer reacts readily and logically to his circumstances but, machine-like, exhibits the habits of his mind just as he clings to the habits of his daily life. Interest is apt to be retracted from the world and other people and to centre in self. Fortunately we all know of instances in which gentle, considerate, courtly habits continue to hold sway till the last moment of life; but in the majority of cases I fear that the protective instincts begin to preponderate as life loses its interest and the individual his force. Thrift becomes parsimony; caution, timidity; vanity, peevishness; self-indulgence grows into greediness; indolence into apathy.

The patient whose case I have detailed to you cannot compel his sturdy limbs to do his bidding. When he was young, acts which required severe effort and much promptitude or courage were perhaps beyond his power. Now that he is old, the will to move is weak, and each stimulus which urges to movement awakens such fear of falling that its way is blocked, and this is a man whose mind, and muscles too, are unusually robust.

It is dangerous to attempt to treat a subject which raises so many physiological and psychological questions in so brief a space; but after all there is not much in the thesis which I am trying to maintain, however much it may be capable of elaboration. I wish to submit to your consideration the idea that as the nervous system is simple in structure, so also is its mode of action simple; that laws learnt from a study of the spinal cord of a frog hold equally for the cortex of the human brain. To this I would add that when the disturbance of action, the want of logical proportion between circumstance and conduct lies within the sphere of action of these laws, it should not be regarded as madness. A man is neither mad nor shamming because he is incapable of making an honest attempt to use his arms or legs, or if he make the attempt cannot overcome resistance to movement which his fears, whether of falling, or of less easily understood consequences of movement interpose, any more than he is mad

when he displays uncalled-for melancholy or anger, or owing to silly self-consciousness fails to do the healthy sensible action which occasion demands because his mind is preoccupied with wondering how his movements will look, and what others will think of their effect when he does perform them.

ABSTRACT OF THE PRESIDENTIAL ADDRESS

ON

THE EARLY HISTORY OF MEDICINE IN SYDNEY, N.S.W.

Delivered at the Annual Meeting of the Sydney and New South Wales Branch of the British Medical Association.

By G. T. HANKINS, M.R.C.S.,

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IN 1788, Governor Phillip arrived with the first fleet of convicts. The voyage had lasted eight months, and out of 212 marines, only 1, and of 775 convicts, only 24, perished *en route*. The medical officer in charge of the new settlement was John White, Surgeon-General. With him were Dennis Conisden, Thomas Arndell, and William Balmain, assistant-surgeons, the latter of whom gave the name to a suburb of Sydney. The comparative freedom from sickness whilst at sea is to be put down to the opportunities afforded of obtaining fresh provisions on the voyage, first at Teneriffe in June, Rio in August, and the Cape in October. After landing at Botany Bay and finding the spot unsuitable, the settlement adjourned to Port Jackson, and landed at Sydney Cove, where a fresh water stream flowed into the harbour. Although the sickness and mortality on the voyage had been inconsiderable, the community were not long ashore before dysentery and scurvy broke out in their midst, and the hospital accommodation was strained to its utmost. The diet of the convicts was still such as was used at sea, as the amount of live stock brought from the Cape was very small, and the few head of cattle possessed by the Government wandered away and were lost for many years. The medical men succeeded in finding wild parsley, celery, spinach, and other edible plants in abundance, which were of great service to the sick, and formed a pleasant variety to the mess of those who remained well. The leaves of the sweet tea (*Smilax glycyfolia*), the sarsaparilla of the country, were also in much request.

The following year, 1789, we have an account of an outbreak of small-pox, or disease resembling it, amongst the natives. William Charles Wentworth, in his work entitled *A Statistical Account of New South Wales*, writes as follows:—"The small-pox at this epoch of the foundation of the colony by Governor Phillip, and for a short time subsequently, committed the most dreadful ravages amongst the aboriginal natives. This exterminating scourge was probably introduced by the crews of the vessels of M. de la Perouse, who remained for a short period in Botany Bay, whilst our fleet was lying at Port Jackson, and during his stay there established an intercourse with the natives.

"The recollection of this scourge will long survive in the traditional songs of this simple people. The consternation which it excited is yet as fresh in their minds as if it had been an occurrence of but yesterday, although the generation that witnessed its horrors has almost passed away. The moment one of them was seized with it it was a signal for abandoning him to his fate. Brothers deserted brothers, husbands their wives, wives their husbands, children their parents, and parents their children; and in some of the caves of the coast heaps of decayed bones still indicate the spots where these ignorant and helpless children of Nature were left to expire—not so much probably from the virulence of the disease itself as from want of sustenance."

Dr. George Bennett, who I am happy to say is still amongst us, came out first to the colony in 1829, and in one of his

works entitled *Wanderings of a Naturalist in New South Wales*, he describes a disease resembling small-pox which broke out in 1831 amongst the natives of Wellington Valley, on the Lachlan, Burraborang, the Cox River, and Goulburn Plains. Amongst the tribes of the Liverpool Plains it presented a near approach to confluent small-pox as seen in Europe. The disease was chiefly fatal to adults and old people, seldom to children. The aborigines made no objection to vaccination.

Dr. Mair, who furnished a report to the Government, stated that it approached much more nearly in its symptoms the character of small-pox than any other disease with which we are acquainted; that vaccination seemed to possess a controlling power over it; and that it was not confined to the aborigines, but in one instance attacked a European in the form of secondary small-pox, and proved fatal to a child with symptoms resembling confluent small-pox. This report was followed by an official notice in the *Gazette* recommending vaccination.

In 1790 it is recorded that Governor Phillip, whilst interviewing some natives, received a spear wound, which entered just above the collar bone and came out at the back of the neck. The weapon was skilfully extracted by Mr. Balmain, assistant surgeon to the hospital, who immediately pronounced the wound not fatal; it was completely healed in ten days. Another spear wound occurring soon after was of a more serious character. A convict, whilst out shooting game for the Governor, was speared by a native, and when the weapon was extracted, which was not until suppuration took place, it was found to have entered his body under the left arm to the depth of $7\frac{1}{2}$ inches. The spear was armed for 5 or 6 inches from the point with rugged pieces of shell fastened in gum. Recovery was immediately pronounced by Mr. White to be very doubtful. The man died seven weeks after the injury. He seemed to be recovering, but on the afternoon of January 20th died somewhat suddenly. On opening the body the spear appeared to have wounded the left lobe of the lung, which was found adhering to the side. In the cavity were discovered some of the pieces of the bone and shells with which the weapon had been armed.

On June 3rd, 1790, the good news was reported from the look-out at South Head that a ship was in sight. This turned out to be the transport *Lady Juliana*, bringing a fair amount of provisions, but far short of what was expected and needed. A second ship, the *Guardian*, a fast sailer, had left England at the same time with ample supplies on board to last for a year, but the *Lady Juliana* fell in with her at the Cape wrecked on an iceberg. Some of the stores were saved and sent on months afterwards. The *Lady Juliana*, if she did not bring out much food, brought out 220 female convicts, but, much to the disgust of the settlers, they were for the most part old and decrepit. She also brought tidings that when she left home there were 1,000 convicts to be sent at once to Sydney, and, as she had been about ten months at sea, they might now be expected daily.

In the course of the month accordingly the ships of the second fleet, as it is called, began to drop in; first, the *Justinian*, five months from England, and on the day of her arrival full rations were allowed, and the settlement had rest from its anxieties. Afterwards arrived the *Surprise*, *Scarborough*, and *Neptune* transports; and the harbour would have been in a state of enlivenment but for the state of health of the new comers; 261 deaths amongst the male convicts had occurred on the three ships, and sickness still raged among them.

The west side of the cove afforded a scene truly distressing and miserable. Upwards of fifty tents were pitched in front of the hospital, all of which as well as the hospital and adjacent huts were filled with people, many of whom were labouring under scurvy and dysentery. Several of these miserable people died in the boats as they were rowing on shore, or on the wharf as they were being lifted out of the boats. All this was to be attributed to confinement, and that of the worst species—confinement in a small space and in irons, not put on singly, but many of them chained together. On board the ships the masters, who had the entire direction of the prisoners, never suffered them to be at large on the deck, and but few at a time were permitted there. It was said that on board the *Neptune* many died in irons; and what added to the horror of such a circumstance was that their