March 6th, 1884, p. 90, prove that the popular ideas as to the purity of sea-air are quite correct and scientific. Experiments were carried out on board the *Gironde*, a French mail steamer, between Bordeaux and Rio Janeiro, by the commander, Captain Moreau, assisted by Dr. Plantymansion. M. Moreau had previously studied the subject at the Paris observatory of Montsouris, under Dr. P. Minquel, from whom he received his final instructions. He came to the following conclusions.

"At a distance of 100 to 200 kilometres (60 to 120 miles) the atmosphere directed on the sea by terrestrial winds is, in a great measure, deprived of the microscopic organism which it has raised from the surface of the soil—in a word, that the atmosphere rapidly purifies itself by its contact with the immense liquid plains of the ocean, favoured by constant ascending and descending currents, due to changes of temperature. Thus the sea's mission is to seize and destroy the germs which the land-wind throws on it; whence is explained the non-transmission of epidemics and contagious diseases from one region to another, when separated by wide extents of sea. Whenever they are thus transmitted, the germ may be presumed to have been brought by vessels."

Taking an average of the analyses made between Bordeaux and Rio Janeiro, eight in number, M. Moreau found the number of spores in a cubic metre of air to be 530—many, no doubt, furnished by the ship itself; whereas, at the Observatory of Montsouris, near Paris, the number, on an average of four years, was found to be 14,000. Scarcely any bacteria, bacilli, or micrococci were found—only, on an average, five or six in ten cubic metres of air. Thus, with a systemic wind from the sea, the air on the sea-coast must be all but absolutely pure, even more so than that of mountain regions. This will be good news for those who live on the sea-coast; for those who take their health holiday there; and for those who take refuge in winter in coast sanatoria. The latter seem on the eve of being unjustly dethroned in favour of mountain elevations. Instead of avoiding the shore, however, as invalids are now-a-days constantly told to do, they may continue to seek it, and to live if they like within a few feet of it in our English fashion. This I have ever done. I have had an instinctive prevision of these scientific facts; and, for the last quarter of a century, have pitched my winter tent as near to the sea as I possibly could. Believing in fresh air as firmly as your townsman, Dr. Mac Cormac, and being determined to carry out the physiology of respiration to its extreme scientific limits, I felt sure there was no better place for that purpose.

In conclusion, I do not deny the contagion of phthisis, far from it. I accept it in certain conditions and limits, bacilli or no bacilli; but I do not consider it to be the regular habitual cause of phthisis, as asserted by many. Like all the seniors, I am watching with interest the labours of our juniors, ready to accept any change of doctrine they may present to our notice the moment its truth is proved. Such doctrinal changes must be founded, however, on clinical experience, as well as on microscopical research. In the meanwhile, as I have repeatedly stated, the contagion-theory will help on powerfully to the general acceptance, in health and disease, of the physiology of respiration. It is still shamefully ignored in the routine of daily life, as well as in the sick-chamber, especially on the Continent, by medical men as well as by their patients.

INTESTINAL INTUSSUSCEPTION.

Read in the Section of Medicine.

By A. K. YOUNG, F.R.C.S.I.

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I PRESUME it may be expected that, at a meeting of this kind, not only new theories, broad and extensive philosophical views over the unbounded fields of nature and of science, reports of the bold, the almost audacious, surgical practice of the present age, but even cases in practice where circumstances called for remedies of unusual kind, are expected (at least, will not be esteemed out of place), if such are brought under the notice of the Association, as they may exhibit by their narration many more interesting points than the success or failure. I shall, therefore, with your permission, proceed to lay before you, as concisely as I can, a case from one of my prescribing books, as being instructive and interesting in several aspects; as showing to what extent a remedy that is common enough may be used; the strength of the human intestinal canal to sustain such a trial; the power of the constitution to endure the presence of such a quantity of the powerful metal, mercury, for a length of time, with perfect unconcern at its presence, and without showing in the very least degree any

one of the usual symptoms, which the very smallest quantities, when in chemical combination, so constantly exhibit.

In 1876, on May 2nd, James M., aged 59, a farmer, married, and having a family, presented himself at the County Monaghan Infirmary. On referring to the books of the institution, I find this short entry made on his admission: "Obstipation from intussusception of the intestine; no evacuation from the bowel for two weeks." On referring to my prescribing book, I find he was treated in the not unusual way: by large enemata of soap and water, castor oil, and opium; by which means only very occasionally slight traces of feculent coloured matter were obtained, possibly only intestinal secretion.

On the morning of May 6th, finding no response to the careful perseverance in these remedies, I thought I would try another, and, if possible, aid mechanically the liberation of the obstructed part. Accordingly, I had the long enema-tube connected to a strong elastic one proceeding from the waste-cock of the water-tank on the roof of the house about 30 feet above our heads. The tank-water was agreeably tepid from the rays of the very hot sun to which it lay exposed. When the enema-tube was passed into the rectum as high as it could be without violence, at 10.45 P.M., I turned the tank-water into the tube, the great pressure of which I hoped, by acting steadily, continuously, and without the jerking unavoidable in the ordinary enema-apparatus, might possibly dilate the containing and liberate the contained portions of intestine. This very enormous and steady pressure I maintained for nearly five minutes without the slightest effect.

May 7th. Notwithstanding the large quantity injected last night at near 11 o'clock, he did not pass anything, nor even return the water injected under such unusual circumstances. The belly was swollen, but he said "it did not feel more so than it did on the previous morning." The obstruction would seem to be in the left hypochondrium. The tongue was moist, and only slightly coated. There was no great thirst. He took very little nourishment, being, as he said, "afraid to do so, as he was full enough." He urinated, but not abundantly. He had no hiccup nor vomiting. The pulse was as usual, i.e., exceedingly irregular and uncertain. He slept well. At 2.30 P.M., another high-pressure enema was given, and, whilst the abdomen was full of water, I well and carefully kneaded it, and especially at the left hypochondrium, where there seemed to me a doughy hardness, as if from blocked-up faeces; the result was four or five bits of feculent matter, such as a child of four years old might have passed. At 4.30 P.M., another high-pressure enema was given. After this third enema, he expressed himself as feeling "rather comfortable." There was no further result.

I had hoped this powerful pressure of water, which presses equally in all directions, would have the effect of distending the containing part of the bowel; and that its upper pressure, at the same time, might force up or dislodge the contained or strangulated portion; but, after the fair and careful trials I made, I gave this up, and bethought me of another force to act in the opposite direction. At 6 P.M., I passed the tube into the stomach, and, by aid of a small glass funnel, I decanted two pounds of quicksilver into the stomach slowly. In an hour afterwards, he said "I feel something like colic-pains." This passed off in a short time. At 10 P.M., on my visiting him, he produced a stool such as a child of five or six years old might have evacuated. It was of a greyish colour, semi-consistent, as much as would fill a goose egg, not foetid. There was not the least particle of mercury with it. He had urinated pretty fairly, as usual. There was no abdominal pain whatever. The residue of the mercury, all the quicksilver I possessed—namely, one pound and two drachms, making altogether three pounds and two drachms—I introduced, as in the first instance, through the glass funnel into the stomach. He did not complain of any abdominal pain whatever. He was sent to bed, and directed to lie on his right side for an hour; after which he might turn as often as he felt inclined.

May 8th. At 10 A.M., he was reported "not to have had a bad night by any means." He had ejected from the stomach a quantity of dark coffee-ground-looking material or tough phlegm, along with some curdled milk and remnants of broth. There was not the least appearance of fecal matter. He complained of more uneasiness in the belly, which was slightly painful to manual examination. There was no attempt at defecation. Tongue moist. He was sweating slightly. Pulse fuller than on yesterday. I ordered a large oleaginous enema, with thirty drops of tincture of opium every hour. At 2 P.M., his countenance seemed anxious. He was lying on his left side, as he said "it pained him very much to lie on his right side." He complained of much pain over the right iliac region, which was much increased by pressure. The abdomen was tense; the pulse strong and full; the tongue was moist. Between this time and 5 o'clock, he had two large enemata of soap and water, castor-oil, and a drachm and a

half of tincture of opium in each, of which the greater part came off at once after each introduction. A little feculent matter came away with the last, on which he expressed himself as "being easier." At 5.30 P.M., he had another enema as the last, without any result. He took a strange fancy to have a bit of boiled beef, which was given him. At 8.30 P.M., an enema as the last was repeated, without result. At 10.30 P.M., he expressed himself as "feeling quite easy and comfortable, and no pain at all in my belly." The abdomen was very much less. He passed a very large amount of flatus after the last enema, which immediately followed the withdrawal of the tube. The tongue was moist. The countenance had nearly lost the anxious expression. The pulse was full and soft, with hardly a trace of intermission. He relished the beef very much; had no nausea, and was inclined to sleep.

May 9th, 6 A.M. He was reported to have passed a quiet night.

May 10th, 9 A.M. The man went on varying as to pain, vomiting, etc., until now, when he was vomiting everything he took. The belly was round, tense, and tympanitic. The tongue was drier than on the previous day. There was no evacuation from the bowels of any kind. His urine was scanty. He had much pain in the situation of the ileo-cæcal valve. The pulse was becoming small and unsatisfactory. He was anxious to leave, that he might die at home. An enema of two pints, with two drachms of tincture of opium, was given. A little feculent matter came off with the discharge. He expressed himself as "feeling a little easier." He had sent for his horse and cart to take him home, and desired to leave as soon as it arrived. To this I made no objection, having only cautioned him as to the increased danger in going so late in the evening in his present weak state. Indeed, as to his going home in his cart, I offered very slight opposition. Knowing that the latter part of the journey was to be over a rough mountain-road, I hoped the jolting would facilitate our endeavours to procure the alvine discharge. At 6 P.M., he started for home, easier than he had felt for some hours previously.

On May 12th, the day after he left the Infirmary, my friend Dr. Adams rode to the man's dwelling. He had been very unwell, and vomited much on the previous day. The man reported that "he was surprised this morning at feeling something running from him into the bed." He "could not make out what it was when he saw it." The bowels were moved twice afterwards. Quicksilver (for the first time) came with each discharge.

May 13th. The bowels discharged twice this day; quicksilver coming down with each feculent discharge. He took some nourishment, namely, gruel and butter, also some broth.

May 14th and 15th. The report we received, as well as we could elicit it from him and those around him, was as above. He had no hiccup nor vomiting. His urine was in fair quantity.

May 16th. I rode six or seven miles to visit him at his home. The account I had is as follows: on his way home from the Infirmary on the evening of the 10th, he was obliged to stop the cart, and go into the field, where he had an evacuation from the bowels. He could not say whether any of the mercury came away with the discharge, whatever it was (the evening was then dusk). At his house, I found him in bed, somewhat pale; his expression was good, his eyes were clear, his voice was strong and confident. The tongue was coated, dirty white. The bowels were twice moved this morning before my visit. The discharge was small in shape, in quantity as much as would fill a large breakfast-cup, and a little "of the beads passed at each time" (the children amused themselves by "hunting the funny wee beads" through the floor). The pulse was irregular and uncertain as to strength. The belly was swollen, and he said "it was very painful." I pressed it all over (kneading it), and he did not make any complaint of pain. There was a hardness in the left hypogastric region, which proved to be flatus on the handling of the part, and easily dissipated by pressure. There was no uneasiness of gums or mouth, nor any tumefaction nor softening about the teeth or gums. He had no tenesmus on defæcation. He took a good deal of well boiled gruel (and butter free from all trace of salt). He occasionally sat up; this I had encouraged him to do, and to very carefully keep up a rupture he had on the left side. He rested better on the left side now, but occasionally turned on the other. There was no decided hardness to indicate collection anywhere (excepting where flatus collects, which was easily dissipated by manipulation), and yet there was an unsatisfactory doughiness of the abdomen. I explain this better probably by saying that the abdomen did not convey to the hand that feeling of emptiness we might have expected under the circumstances.

May 18th. Dr. Adams visited him for me this morning. He found him sitting up and moving about. He said he passed some of the quicksilver last evening, and a very small quantity of feces, and none else all yesterday. To-day he passed twelve and a half drachms of

quicksilver, which Dr. Adams brought with him. He also discharged some scybala of a dark colour. The pain in the hypogastrium from which he suffered was quite removed, he said, "because he kept up the hernia, and moved about as I had so recently directed," so that it was not detained in the scrotum. The tongue was yellowish-white; the appetite was good, but "he was afraid to eat much." The kidneys were not acting well, and he had pains across the loins. The pulse was uncertain in strength, and occasionally intermitting.

May 21st. Dr. Adams visited him again this morning. The account he received was that yesterday, about noon, he was seized with pain across the hypogastrium. This increased so much that he was about to send for me, when he took three ounces of castor-oil, and, in ten minutes afterwards, the bowels discharged enormously, so as to quite fill a crock that would hold six or seven quarts; this was followed by immediate and great relief of pain. The discharge was accompanied by a small quantity of the quicksilver. Matters remained quiet until this morning (21st), when the bowels discharged again to nearly as great a quantity as yesterday, and a large quantity of quicksilver came away with it. He described the discharges as being of a "solid nature, very tough, and covered by a slimy-looking matter." The tongue was clean. The belly had subsided, and was as if empty. There was no vestige of doughiness anywhere, nor of tympanitis. He had no pain anywhere. He urinated much better. The pulse was regular, without any intermission; it was quick and strong, but full and round.

I did not see him again for some weeks afterwards, although I heard frequently that he was attending to his farm as formerly, was in good health, and active as usual. Then I heard of his having died about seven weeks or so from the time he left the Infirmary, and this is the account I received. He was running to turn some cattle out of a crop into which they had broken, when he was suddenly seized with pain in the abdomen. The bowels ceased to act; the pain increased; and one of his neighbours, a corn-miller, undertook to cure him at once. He proceeded to dose him largely with butter and cabbage, and he died unrelieved in a few days.

OBSERVATIONS.—The great points of interest which attach to this case are, the length of time the man endured a serious attack without having succumbed; the enormous quantity of feculent material accumulated in the intestines; the slight effect which forcible and powerful water-pressure exerted on the canal; the power and strength of the canal to bear such a weight of mercury as three pounds two drachms, poured in, we may say, at once, or very nearly so. Another remarkable point is the tolerance of the pressure of such a quantity of the metal for so great a length of time, namely, from May 7th, at 10.45 P.M., until about 7 P.M. on the 10th, when probably a little was passed whilst going home; but until the 18th there was not any large quantity discharged at once; and until the 20th, nearly thirteen days, a considerable quantity of quicksilver remained, when the great evacuations from the canal were probably accompanied by the residue of the metal. Neither during the time it was blocked up in the abdomen, nor at any time after its discharge, was there any symptom, constitutional or local, to indicate its presence.

The rationale of my having recourse to this remedy was that, as I had known of its having been tried on many occasions with varying success, I thought the cause of failure in many instances was the want of a sufficiency of the quicksilver to liberate by its weight the strangulated part. In general terms, we may look upon the containing and contained portions as forming a bag, the floor of which was formed by the narrowed descending bowel, and the sides of the bag by that portion of intestine immediately above and continuous with it. The exterior descending portion is reflected from the lowest part of the strangulated gut, and upwards external to it as far as the upper part of the strangulation, then turns downwards on itself externally, and is continuous with that which is below the strictured part. In all these reflections, the serous membranes are opposed to and in contact with each other.

When the upper portion descends and is strangulated, at that point of strangulation the bottom of the bag is formed with the aid of the upper portion which descends to the stricture, and is capable of containing more or less of whatever falls into it. If we could take this part of the bag immediately above the strictured point, and pull it upwards, or distend it laterally, the strictured part would be pulled upwards or outwards by the distension, the lymph attachments of the opposing serous surfaces would yield, and ultimately the strictured portion would be raised out of its narrowed bed, and the bowel set free.

In order to obtain this, I bethought me that, by introducing into this bag I have endeavoured to describe, a considerable weight of mercury, the sides of the bag would be distended by the heavy and

movable medium ; that every movement of the body would keep this in continual motion, and as this pouch was thus increased, and the weighty mercury constantly exerting pressure and a dragging, now on this side now on that, and more and more still as it became more and more distended, and the tendency of all this to pull at the upper descending part of intestine, and drag it over the reflected brim of the detained gut, ultimately we might hope to attain the end we had in view. For this purpose I rather encouraged his journey in his springless cart homewards on the rough road. The result was soon seen. He had not gone two miles when there was an alvine discharge of satisfactory amount ; but as to its colour, or the presence of mercury, there was no ascertaining, it being dusk. However, the perusal of the accounts received leaves no room to doubt that my design in using the very unusual quantity of quicksilver was accomplished. That this was a true invagination there can be no doubt ; the different discharges at uncertain times, with varying quantities of the metal, until the channel of the intestine became sufficiently open, and then followed by the enormous discharges, from the doughy beds of a retained faeces ; the perfect health the man enjoyed for weeks ; the recurrence of his familiar pain in the abdomen excited by violent exertion, and the perfect occlusion of the bowel until he died, all prove this to be a true case of intussusception.

* * Should difficulty be experienced in tracing the reflections of intestines as above narrated, a glance at plate 6 in Dr. Brinton's excellent work on this accident will at once render my meaning plain.

A NEW SYMPTOM AND A NEW THEORY OF LOCOMOTOR ATAXY.

Read in the Section of Medicine.

By JULIUS ALTHAUS, M.D., M.R.C.P.,

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THERE is no disease in the whole range of pathology which may commence in such extremely different ways as *tabes spinalis*, or *locomotor ataxy* ; and it is undoubtedly this circumstance which accounts for the mistakes which have been, and are even now, so frequently made in the diagnosis of the earlier stages of that disease. We may, at the same time, have a number of patients under care who are all in the first stage of *tabes*, and who have yet hardly a single symptom in common. One of them may complain of loss of sexual power ; another of hyperæsthesia in the back ; a third of a troublesome form of indigestion, and a sensation of tightness round the stomach ; a fourth of rheumatic or neuralgic pains ; a fifth of failure of sight, and double vision ; a sixth of a feeling of intense lassitude and exhaustion. This shows the great importance of being intimately acquainted with all the truly protean forms which this extraordinary malady may assume ; an importance which is by no means only theoretical, but chiefly practical ; for it is in the first stage of *tabes* that our therapeutical efforts are more likely to be crowned with success than at any later period in the evolution of the disease.

The principal new symptom which appears in the second stage of *tabes*, and which imparts an entirely new aspect to the malady, is that of *ataxy*. From this time forward, *ataxy* overshadows more or less all the other symptoms, with the result that patients in the second stage of *tabes* resemble one another a great deal more than in the first. The extreme differences which exist in the first or pre-*ataxic* stage begin now gradually to fade away, and the diagnosis is rendered proportionately easier.

I have been led, by long-continued observations on numerous cases of this disease which have happened to come under my care, to distinguish three different epochs or periods in the development of the *ataxic* stage of *tabes*. Such a distinction has not hitherto been made, but I believe that it will be found to considerably facilitate the study and comprehension of the different aspects which this important symptom is apt to assume at different times in the progress of the disease. These periods I will characterise as follows.

1. The initial period, in which *ataxy* is so slightly marked, that a skilled exploration is required to discover the symptom.
2. The truly *ataxic* stage, in which the peculiar walk known as the *ataxic gait* is observed ; and,
3. The period of muscular madness, in which even the typical *ataxic gait* is no longer possible, and muscular action, as far as it still exists, is in utter confusion.

The transition from the first to the second period of the disease is often so slow and gradual as to be almost imperceptible. Indeed, the

muscular disorder may at first be so trifling, that the patient succeeds, by slight unconscious efforts, in obviating any actual inconvenience.

At this initial period of the second stage of *tabes*, a skilled objective exploration of the patient's condition is of paramount importance. The subjective symptoms of which he most complains are often misleading and comparatively insignificant ; while the principal objective sign is often so concealed that only the specially trained observer is able to recognise and appreciate it. At this time, a patient may still be able to walk four or five miles at a time without much fatigue, and often scouts the idea that there is anything wrong with his walking powers. It is, therefore, necessary to make him go through a certain number of tests, some or all of which, when *ataxy* is present, will infallibly reveal it. The more important of them are, to watch the way in which the patient gets up from a chair or a couch ; to make him stand with his feet close together, or on one leg, and with his eyes closed ; to make him turn round quickly ; and to go downstairs ; when certain peculiarities will, in a general way, be noticed, which will betray the *ataxy*.

In addition to these tests, I will now describe another symptom, which I have not seen mentioned in any previous treatise on this disease, and which is, that the patient has a considerable difficulty in walking backwards. This faculty, which is chiefly practised and valued by courtiers, is nevertheless possessed by all ordinary mortals as long as they are in good health. For the *tabid* patient, however, it is mostly very difficult to walk backwards, at a time when he may have very little or no trouble in walking forward. His heels seem to catch the ground ; he dare not move, for fear of falling ; and, if he succeed at all in walking backwards, it is in a peculiarly halting and odd fashion, which at once attracts attention.

I noticed this symptom for the first time in the case of a gentleman, aged 24, who consulted me in February 1882, and who was, in consequence of certain official duties, obliged to walk backwards a good deal. For years this had been the easiest thing in the world for him ; but during the last six months he had been mortified to find that he experienced considerable difficulty in accomplishing this feat. He told me that his health was otherwise excellent, with the exception of "rheumatic pains" in the limbs, to which he had been subject, off and on, during the last three years. I then examined him for the patellar tendon-reflex, and found it absent in both sides. In the further course of the interview, I elicited that the patient had had syphilis ten years ago ; that he had a temporary attack of double vision three years ago ; that there was, occasionally, incontinence of urine in the morning, and habitually a feeling of numbness in the soles of the feet. The patient was still able to walk exceedingly well in the daytime and on a level road, but had found difficulty in walking in the dark. He went satisfactorily through most of the other tests, showing that he was just in the commencement of the second stage of *tabes*. The walking backwards was, indeed, the most troublesome thing he had to contend with ; and the contrast between the clumsy and awkward way in which he did this, and the apparent ease with which he walked forward, was indeed striking. When attempting to walk backwards, his heels seemed to become entangled in the carpet ; he evidently did not know how to raise his feet properly from the ground, and on one occasion he would certainly have fallen unless I had supported him. All the muscles of the thighs and legs seemed to become rigid the instant he attempted to walk backwards, while in walking forward he appeared to have no difficulty whatever in bending his knees to the proper degree.

Since then, I have made it a point to inquire about this symptom in patients suffering from *tabes*, and have found it present in the majority of cases. In an artist who is now under my care, this difficulty is particularly annoying, because it prevents him from taking a perspective of his pictures by walking backwards from his easel. In this case, there are no symptoms of *tabes* above the waist, so that the patient is able to paint as well as ever.

In difficult or doubtful cases, therefore, more especially in those at the very threshold of the *ataxic* stage of *tabes*, the symptom I have mentioned may put us on the proper track, and lead us to examine the patient who shows it for other symptoms of the malady. As *tabes* is still frequently confounded with gout, rheumatism, neuralgia, dyspepsia, idiopathic amaurosis, and other conditions, any addition to our means of diagnosis for that stage where the malady is not yet fully developed must be welcome, and this has been my reason for submitting it to your notice.

I now proceed to the second part of my paper, namely, to develop, as concisely as possible, the theory of the symptom of locomotor and static *ataxy* which I have, after careful consideration, been led to adopt.

Time prevents me from entering fully into the other theories which