too, I have given a fair trial to : the value of Dr. Hardy's douche in allaying local pain is exemplified in Cases I. and V., while in the former, by the steady use of it when symptoms of tetanus threatened, their development was arrested and life saved; whereas, in the latter, *when established*, the disease seemed to continue independently of its local origin, and not to be influenced by local means. The internal administration of chloroform, though in conjunction with large doses of opium, did not cure the disease, but only retarded its baneful influence, just as the inhalation of the anæsthetic only checked the agony of the convulsive paroxysm, mitigating the torture and rendering less frequent the spasms of the diaphragm.

ART. XIV.—*On the Presence of Foreign Bodies in the Air-tubes. Illustrated by a Case in which a Fish-bone passed into the Left Bronchus.* By JOHN HUGHES, M. D., Licentiate of the Royal Colleges of Physicians and Surgeons of Ireland; Physician to Jervis-street Hospital, one of the Medical Officers of the Richmond Lunatic Asylum, &c.

ALTHOUGH the records of medicine furnish numerous examples of the introduction of foreign bodies into the air-passages, which present the greatest variety and diversity of character, both as regards the foreign bodies themselves and the symptoms they give rise to, yet the subject is far from being exhausted; indeed, I might say its extreme interest is scarcely diminished. And this is not surprising; for we cannot well imagine anything more frightfully distressing or dangerous to a patient than the presence of a foreign body in the air-passages, nor one the management of which more completely taxes the skill and judgment of the medical attendant.

These considerations will, I trust, excuse me in bringing forward the details of a case which has been lately under my care in hospital, and the interesting pathological appearances in which have been carefully noted. To an account of it I will append some general remarks illustrative of the accident and its treatment.

James Brady, aged 38, married, a house-carpenter by trade, applied at the dispensary attached to Jervis-street Hospital, about the middle of last December, for relief from a cough, which was accompanied by purulent expectoration and general symptoms of hectic fever, and which was, as he stated, preceded by hemoptysis. He appeared at the time to be in an advanced stage of tuberculous disease of the lungs, but no

physical examination was made: some cod-liver oil was prescribed. In a few days he presented himself again, nothing relieved as to his symptoms; but while answering some questions a very strong fetor from his breath was perceived, and in order to make a full examination he was taken into hospital.

After his admission he stated, that up to ten weeks back he was as healthy a man as any in Dublin; that one day, about that time, he came home to his dinner in usual good health, and in the evening was seized with cough and vomiting; that the cough increased rapidly, and at the end of two weeks was attended with expectoration of a rusty-brown colour, and sometimes with a bad smell; that pain was present only occasionally, when he had a severe fit of coughing, and when he lay on the left side; that about three weeks after his first seizure he had hemoptysis, which continued with more or less severity for three weeks more; that it then ceased, and other symptoms set in. He became rapidly emaciated; had rigors, followed by night sweats; constant harassing cough, with fetid expectoration and complete loss of appetite, but no pain in any part of the chest.

With these symptoms he was admitted into the hospital, and in addition he presented all the appearances of a person labouring under some fatal organic disease. His skin was burning hot, dry, and of a whitish waxy hue; the mucous membrane looked unhealthy; the tongue was moist and clean; bowels confined; urine scanty, and depositing lithates; pulse 120, small and weak; there was extreme fetor of the breath, perceptible even at a distance from the bed; he has frequent cough, with expectoration of a muco-purulent character, frothy and stained of a rusty brownish colour. This secretion is also fetid, but in a less degree than the breath, and is expectorated with the utmost possible facility.

The physical examination presented clearness on percussion on the right side, comparative dulness on the left, both anteriorly and posteriorly; respiration was free, and louder than natural on the right side. On the left there were increased resonance of the voice, and bronchial breathing at the apex of the lung, and from the angle of the scapula downwards there was muco-crepitating râle posteriorly. No evidence of a cavity could be discovered.

There was no pain complained of in any part of the chest, and the patient could lie in any position without distress. Moreover, there was no difference in the measurement of either side; there was no dyspnoea, and in fact so little did he suffer, that he often assured me his chest was quite sound, and he would

be quite well and able to resume his work if I could remove the bad smell and improve his appetite.

It is unnecessary to detail minutely the progress of the case. Suffice it to state, that after some treatment the secretions were improved, the râle disappeared from the base of the left lung, there was a slight appearance of general amendment, and the fetor was diminished under the influence of solution of chlorinated soda. But the improvement was only temporary; all his symptoms increased in severity. The cough became incessant, the expectoration very profuse; so much so that when he lay on the right side it flowed from his mouth continuously. The fetor was intolerable. He had neither vomiting nor diarrhœa, and his intellect was clear to the last. Without the addition of any new symptom, he died in five weeks after his admission.

A fortnight before he died there were well-marked signs of a cavity at the apex of the left lung, but previous to that date we could not be satisfied that one existed, although he was carefully examined by some medical friends, and almost daily by myself, and although he had fetid purulent expectoration.

While under observation, this case excited considerable interest, and, in the absence of a correct history, a good deal of speculation as to its precise nature. Was it tubercular disease of the lung? The appearance of the patient, the situation of the physical signs in the apex of the left lung, the hemoptysis, followed by hectic and wasting, made such a diagnosis anything but improbable.

But then, the suddenness of the attack, *the limitation of the disease to one organ*, and the fetor, although such symptoms have occurred in phthisis, threw a doubt upon this opinion. Was it cancer of the lung? The waxy hue of the skin, the limitation of the affection to one side, and the fetid expectoration, together with the signs of consolidation of the lung, made this view probable. But, then, there was no pain, no dyspnœa, no flattening or retraction of the side, and the dulness on percussion was not complete, nor did it extend beyond the mesial line. The absence of these signs, the suddenness of the attack, and its brief duration, threw more than a doubt on such a diagnosis.

Was it empyema? Clearly not. There was neither retraction nor dilatation of the side; the dulness was not complete, and was unaffected by change of posture; there was no displacement of the heart or mediastinum, and there had been hemoptysis, a symptom not belonging to empyema.

Was it simple pneumonia, ending in abscess? The he-

moptysis alone constituted our grounds of hesitation as to such a conclusion. In fact, the case was peculiar in presenting some of the symptoms of each of these diseases, so as to throw doubt on every diagnosis. And of the real origin of the affection there was not the remotest suspicion; for the patient, although repeatedly questioned as to his previous history, never alluded to an accident having occurred to him.

The post-mortem examination alone revealed the true state of the case. An examination of the body was made in presence of my colleague, Dr. Neligan, and the class of the hospital. On opening the thorax we found the left lung, adherent around the apex, free inferiorly. Endeavouring to detach it from the walls of the chest, the resident pupil, Mr. Constable, forced his fingers with very little difficulty into an abscess, situated in the posterior portion of the superior lobe, and met with a fish-bone lying loosely in it, which he removed. On further examining the organ, we found it occupied by a series of abscesses passing through the centre of the lung, from its apex to its base, and communicating with one another, none, however, approaching the surface, save one, situated below the clavicle, which, as I have already stated, was diagnosed a few weeks before death. These cavities were not very large, but they established a kind of channel running through the lung, and were surrounded by condensed structure. The right lung was perfectly healthy. There was not a trace of tubercle in either.

The mucous membrane lining the larynx, trachea, and left bronchus, showed the results of inflammation. It was softened, and of a dusky red colour. These appearances were confined to the parts enumerated. The right bronchus from the bifurcation downwards was quite healthy, and presented a natural colour and appearance.

The œsophagus was examined, and found in its normal condition, as were all the other organs, save the liver, which was somewhat enlarged, merely from congestion.

Surprised at the discovery of a foreign substance in the lung, the existence of which the patient never hinted at during life, I sought out his wife to obtain her history of the case. She stated that her husband was of intemperate habits for several years past, and that on a Friday, sixteen weeks ago, he came home rather drunk. She had a small fried fish—a plaice—ready for his dinner. He appeared very hungry, and commenced his meal by pulling off the skin of the fish, and stuffing it into his mouth. Immediately he began to cough,

and exclaimed he was choked. His breathing was not much interrupted after the first paroxysm of coughing was over, but he felt something sticking in his throat, and ate a crust of bread to dislodge it. This did not succeed. His uneasiness, however, was not very great, and he went to sleep.

Next day he complained of the feeling in his throat, but he went to his usual work, and was attacked during the day with fits of coughing and vomiting. The following day was Sunday, and not finding himself relieved, he tried to get rid of his uneasy sensations by drinking a considerable quantity of whisky.

On Monday he first applied at a dispensary, but it is not known what history he gave of himself. His symptoms, however, at that time could not have been very urgent, and the medical attendant must have looked upon him as an ordinary case of cold, for he prescribed only a cough-bottle and pills.

His symptoms were unchanged for five or six days, but at the end of that time he felt a pain below the left clavicle, and could not lie on that side, at the same time his cough was more frequent, and he was not able to work. He again applied at two or three public hospitals; told how he suspected a bone, or some other foreign substance, had entered the air-passages; and was examined by physicians of great experience, who assured him he was mistaken as to the presence of an extraneous body in the air-tubes. This appeared to have satisfied him on the point, but he felt no relief as to his symptoms. The cough increased, and hemoptysis came on. He grew weak, lost flesh, was unable to work, and remained at home for some weeks, until he was admitted into hospital by me.

Such is the substance of the wife's story, and there can be no reasonable doubt as to its accuracy in all essential points. The bone found in the lung, and represented in the annexed woodcut, corresponded exactly with the bone of the hyodean segment of a small plaice of the same size as his wife said she dressed for his dinner, and came away with the skin of the fish, when torn off as she described was done by her husband.

There can be no doubt whatever that this foreign substance entered the air-passages through the glottis. In this case the absence of any external wound and the integrity of the œsophagus appear to me quite conclusive on the point. But if additional proof was required, we have it in the knowledge of the

fact, attested by numerous cases on record, that there is scarcely any substance, however singular, which may not enter the air-passages.

The animal, the vegetable, and the mineral kingdoms have each furnished their samples, presenting a most curious and diversified catalogue.

In one case a child eleven months old inhaled a shawl pin two inches in length, and with a head nearly as large as a marble^a.

In another a man lost his life by the intromission of a piece of sponge into the trachea^b.

In a third the larynx of a goose became impacted in that of a boy twelve years old^c.

In a fourth instance a man inspired a puff dart, an instrument made of a nail wrapped with worsted at one end, and used for blowing through a tube; and Pelletan's case, related in his *Clinical Surgery*, in which a child two years old inhaled a piece of the jaw-bone of a mackerel, and recovered, is well known^d.

Dr. Watson in his *Lectures* relates a case in which a nobleman's son, while riding in a carriage near Paris, happened to have an ear of rye in his mouth. The carriage jolted, and the rye disappeared. Some time after, pulmonary irritation set in, attended with hectic fever and fetid expectoration. The boy died, and the ear of rye was found in an abscess common to the right lung and the liver.

Other cases might be quoted, but these few are sufficient to prove that substances the most unlikely from their form and size to pass through the rima glottidis have nevertheless entered the larynx. Indeed, this fact has been long since established and explained by the late Dr. Houston, in recording a case where a large molar tooth had passed into the larynx, and therefore we cannot hesitate in concluding such an occurrence happened in the present instance.

When a foreign body has passed the rima glottidis, the situation it may occupy will greatly depend upon its size, form, and weight. If the substance be large, rough, and irregular in shape, it will most probably be arrested in the larynx, while, if it be small, smooth, and rounded, it will either move up and down the trachea with inspiration and expiration, or it will descend into the bronchial tubes and remain impacted in one of

^a Dr. Mott of Philadelphia, in *Cooper's Surgical Dictionary*.

^b *New Hampshire Journal of Medicine*, 1852.

^c *London Medical Gazette*, 1850.

^d *Provincial Medical and Surgical Journal*, July, 1849.

them. If, again, it be slender and sharp-pointed, like a nail, pin, or fish-bone, it may become fixed in any part of the walls of the larynx or trachea, unless indeed it enters the aperture of the larynx in a vertical direction, when it may fall at once into the bronchial tubes. This must have been the way in which the bone in the present instance entered the air-passages—its length (two inches) would prevent it from passing through the rima and the division of the bronchus in any other than a vertical position. Such being the case, we can well imagine that it afforded little obstruction to the respiration while it remained in the bronchial tube, as the air could pass in and out on either side of it; consequently, there were no well-marked physical signs of obstruction, and the physicians whom he consulted, in the absence of such evidence, altogether discredited this man's statement.

But even if physical signs of obstruction did exist, and were recognised, their occurrence on the left side would greatly tend to obscure the diagnosis, and render it more than ordinarily difficult. "For," as Dr. Stokes remarks, "the cases in which a foreign body enters the right bronchus are so much more numerous than those in which it occupies the left, as to make the signs of irritation and obstruction in the right lung important diagnostics of the accident in question." And a later writer^a on the subject goes farther, and states that—"The number of cases of death without operation and without expulsion of the offending body, is 21; in these the substance was situated in 11, in the right bronchial tube; in 4, in the larynx; in 3, in the trachea; in 1, partly in the trachea and partly in the larynx; in 1, in the 'lung;' and in 1, in the right thoracic cavity. *In not a single instance did it occupy the left bronchial tube.*" "In 34 cases subjected to operation or general treatment, the extraneous substance was situated only 4 times, certainly, in the left bronchial tube." Here, then, we have two Tables, containing no less than 55 cases, and only in 4 was the offending substance situated in the left bronchial tube. These facts quite justify the prevailing opinion as to the greater frequency of foreign bodies being situated on the right side; and so important a fact has been variously explained or accounted for by several writers. Some attribute the phenomenon to the greater dimensions of the right bronchus, in consequence of which the air is supposed to enter with greater force and velocity, and so direct bodies to that side; others, that the right bronchus forms a more obtuse angle with the trachea than its fellow of the op-

^a Gross on Foreign Bodies in the Air-passages.

posite side. "But the true cause," as Dr. Stokes remarks, "will be found in the anatomical disposition of the trachea at its bifurcation, where we may observe that the projection or septum, dividing the right and left bronchi, is not in the mesial line, but decidedly to the left of it, so that a body passing through the glottis will be directed to the right bronchus." "For this observation," he adds, "I am indebted to my friend Mr. Goodall." It is most certainly one of great interest and value, and doubtless the anatomical arrangement of the mucous membrane has a great influence in directing the course of bodies of a rounded form and moderate size, which are capable of moving freely in the trachea. But in the present instance it is probable the curved form and pointed extremity of this bone influenced its direction, and caused it to deviate from the ordinary channel.

We see, then, that foreign bodies are rarely found to occupy the left bronchial tube, and if we except a case related by Dupuytren, in his *Leçons Orales*^a, in which a small coin, movable for five years, became fixed in the bronchial tubes, inducing phthisis, and causing death at the end of ten years, and in which the coin was discovered in a tubercular cavity of the lung (it is not stated which lung), the present is the only instance, so far as I know, of a foreign body being found in a pulmonary abscess, and the first recorded in which it was discovered in the left lung. Taking these facts into consideration, the diagnosis of this case must have been both difficult and uncertain.

It is to be regretted that the early history of the case is so imperfect, and that no account of the physical signs, if any existed, could be obtained. From what we could collect, I have already inferred that the symptoms were not severe or urgent, and, perhaps, altogether belonged to irritation and inflammation of the mucous membrane. There were no fits of suffocation, no dyspnoea, no symptoms of obstructed respiration. Such a result succeeding the intromission of a foreign body into the air-tubes is not, however, uncommon. Lacroix gives an instance in which, after the first few minutes, the patient did not experience a bad symptom for an entire year; and Dr. Struthers relates a case which very much resembles the present one as to its symptoms,—the great difference being its more chronic nature, and the situation of the foreign body.

Thomas Neal^b, a footman, aged 22, while eating part of a fowl, was suddenly seized, while in the act of laughing, with a violent fit of coughing and a feeling of suffocation; he became

^a Tome iii.

^b Dublin Medical Press, November 24, 1852.

blue in the face, felt a sharp pain in the chest, and was sensible that some of his food had entered the windpipe. These symptoms subsided in half an hour, and never returned. He vomited freely from an emetic, and could swallow fluid and solids without difficulty. About an hour after the accident a tickling cough, accompanied by a wheezing in the throat, set in, and continued to trouble him occasionally, but gave him so little inconvenience, that he pursued his usual business as if nothing had happened. He was, however, still convinced that there was something in his windpipe. About three months after the accident the cough began to be accompanied by white frothy sputa, which, without any other change in the symptoms, gradually increased in quantity during the next twelve months. About six weeks after this he observed, for the first time, that the sputa were tinged with blood, and had a fetid odour. In 1848 the fetor of the breath became so marked that he was obliged to quit his situation, and he had considerable discharges of pure blood, amounting occasionally to so much as half a pint. In 1849 he entered the Edinburgh Royal Infirmary, having a good deal of cough, attended with profuse bloody and fetid expectoration. The left side was throughout resonant on percussion, with a puerile murmur, but without any râle. The opposite side was dull over the inferior three-fourths of its extent, both in front and behind, but particularly below the nipple. The local resonance was found throughout increased; a gurgling râle was heard about the middle of this side, posteriorly over a space two inches square, and at several other points the respiratory murmur was very harsh, and obscured by mucous and sibilant sounds. During the next three months there was but little change in his condition; but in March, 1849, he gradually became worse; the breath and sputa had a gangrenous odour; the expectoration was very profuse; and there was great *dyspnœa*, with *excessive weakness and occasional feeling of suffocation*. The right side was universally dull on percussion, and all natural respiratory sound was absent. The left side, on the contrary, was unusually resonant. He expired on the 29th March, 1849. The right bronchial tube, at its middle primary division, contained a small piece of bone, quite loose, clean, and of an irregularly elongated form, with several sharp spiculæ. The mucous membrane at the part was thickened, but quite free from ulceration and unnatural vascularity. The right lung was firmly and almost universally adherent, and contained numerous little cavities, varying in size from that of a hazel-nut to that of a pea. An abscess, about the volume of a small orange, and filled with a brown dirty-

looking fluid, of a cream-like consistence, was found in the apex of the organ. Another, but smaller one, existed at the middle of the lung posteriorly; it was lined by a thick, dense, false membrane, and opened directly into a bronchial tube, the size of a crow-quill, at the other end of which the foreign body was discovered during the progress of the dissection. The left lung was healthy.

We cannot fail to be struck with the great similarity of this case and mine in some respects: the early symptoms and the sensations of both patients were almost identical,—in the setting in of the cough, the occurrence of hemoptysis, and the existence of fœtor, they are quite alike. The physical signs, too, in the advanced stage of both, reversing their situations, are very similar. They differ, however, in the absence, in Brady's case, of any dyspnœa or feeling of suffocation, and in the more acute form and rapid progress of his disease. This might be accounted for by the penetrating shape of the foreign body, which forced its way quickly into the substance of the lung, where its presence excited inflammation more rapidly than if it had remained in the bronchial tubes.

Other cases are recorded by various writers, proving that the presence of a foreign body in the air-passages is not necessarily attended with physical signs of obstruction in the lung; and, amongst others, the case of Mr. Brunel, treated by Sir B. Brodie, is confirmatory of this remark. In his case the chest was often examined, and under various circumstances, yet no abnormal sounds were discovered in the lungs. But it is unnecessary to adduce further proof; the fact is admitted, and experience confirms its correctness.

In concluding these observations, a few words on treatment may not be inappropriate.

As I have already stated, there is scarcely any case more embarrassing to the practitioner than one like the present. He is called upon suddenly, often under great disadvantages, and with an imperfect history of the accident, in the first place, to decide upon the presence of a foreign body in the windpipe, and next to adopt the best means for its removal; for he well knows that the presence of a foreign body in the air-tubes is always a dangerous accident, and if it be allowed to remain there will, sooner or later, prove fatal.

The duty of the medical attendant then is, in the first place, to ascertain, if possible, the presence of a foreign body, and its precise situation; and having satisfied himself as to its existence, and the absence of pulmonary disease, he should next open the trachea. Mr. Liston says:—"No trust is to be

put in any therapeutic means, even in the most chronic cases: errhines, emetics, and demulcents, are alike useless: an opening must, sooner or later, be made in the trachea." And a later writer^a says:—"The only real safety of a person labouring under a foreign body in the air-passages consists in bronchotomy." It is true that various substances may be ejected spontaneously, or through the intervention of art, as the use of emetics and sternutatories, or even by simple inversion and succussion of the body. "But those cases are the exception, not the rule. . . . As long as the extraneous substance remains in the windpipe, the patient is in constant danger of being suffocated; or, if he escape so horrible a death, of perishing from inflammation and its consequences. The proper practice therefore is, in all cases, without exception, to perform bronchotomy as soon as possible after the accident. The artificial aperture effectually prevents spasm of the muscles of the larynx, and thus enables the patient to breathe with greater freedom, at the same time that it prevents the foreign body, if it do not escape at once, to play up and down the air-tubes with comparative impunity."

Both these writers assume that the physician is satisfied of the existence of the foreign body in the air-tubes, and that its presence is manifested by physical signs or urgent symptoms. But how should we act in a case like the one I have just narrated, where there were no physical signs nor urgent symptoms; nothing but the statement of the patient to enlighten us? No doubt, it may be said we should watch the case closely, and wait until symptoms arise demanding operative interference; but it is not clear they ever did arise in this instance, nor that symptoms pathognomonic of a foreign body in the windpipe manifested themselves. The substance, being sharp-pointed, quickly fixed itself in the air-passages, and did not move up and down so as to cause fits of suffocation, nor did its size obstruct the passage of air into the lungs; but it lay there, the source of fatal irritation and inflammation. What then should be done? Would we be justified in opening the trachea, relying on the mere statement of the patient?

I must leave the question still *sub judice*; but I confess it appears to me to have been the only practice that could have given this patient a chance for life. We had to choose between opening the trachea unnecessarily, and allowing our patient to die for want of such an operation.

^a Gross on Foreign Bodies in the Air-passages, p. 207. 1855.