ART. VIII.—*A Case in which a large Molar Tooth entered and passed through the Larynx during the Operation of Extraction.* By John Houston, M.D. M.R.I.A., Demonstrator of Anatomy in the Royal College of Surgeons in Ireland. Surgeon to Baggot-street Surgical Hospital, &c. &c.

(Read before the Surgical Society of Ireland.)

JOHN CLARE, ætat. twenty-nine, a servant of the Rev. Mr. Brownrigg, of temperate habits and good constitution, had occasion, in the month of May, 1830, to get the second molar tooth of the right upper jaw extracted. On the first application of the instrument to the tooth, a fragment of the crown was chipped off, and removed from the mouth by the operator. By a second attempt, the tooth was started from its socket; but on being loosened from the claw of the instrument, it suddenly passed down the throat, and was not seen afterwards by either the patient or the operator. Owing to the large size and firm hold of the tooth in the jaw bone, considerable dexterity and force were found necessary for its extraction.

I saw the man about four hours after the operation, when he presented me with the fragment which had been broken off in the first attempt, and gave me the following account of the sensations experienced at the time of the accident, and after its occurrence. He felt at the instant on which the extraction was completed, a momentary, sharp, prickling pain at the top of the windpipe. This was instantly followed by a severe fit of coughing, which soon went off, but recurred again several times without any evident cause, and at each time with less and less severity, until, after a few hours it ceased to produce any further annoyance. The man stated most positively, that he had not, for a considerable time previously to the accident, been subject to any cough, or other affection of the chest; and that at the instant of its occurrence, both he and the dentist attributed the sudden accession of the symptoms, to the passage of the bone down his

throat. He complained, also, that from the time of the performance of the operation, he could not get rid of a feeling of undefinable uneasiness in the chest ; a sensation of weight in breathing ; and a tendency to draw heavy sighs, which haunted and which kept his mind in a continual state of inquietude. Occasionally, but not at any regular intervals, he coughed up a little frothy mucus, perfectly untinged with blood or purulent matter. He had no hoarseness, no acceleration of breathing though he had walked nearly two miles, no pain in any part of his chest, and no relative difference in the facility with which he inspired, or breathed out the air.

In a consultation with several eminent professional gentlemen, held on him twenty-four hours after the accident, his condition was found to be the same as that just described, and the following stethoscopic signs were noted down : there was a mucous rattle in the lower part of the trachea, audible even to the naked ear, but very distinct when heard through the stethoscope. Both sides of the chest gave a perfectly and equally clear sound on percussion ; but notwithstanding their similarity in this respect, there was a marked difference in the intensity of the respiratory murmur—the sound of the air entering into, and expanding the right lung, being obviously more feeble than that heard at the same moment in the left. There was, likewise, under the right clavicle a slight sonorous rale, a deviation from the natural sound of breathing not discoverable in any part of the left lung. These signs were fixed and not modified or removed by any alteration in the position of the body ; nor by causing the patient to expire with violence, or to take a full breath. In the consultation, various opinions were delivered respecting the course of the tooth, viz. whether it had entered the trachea, or passed into the œsophagus. Some gentlemen, whose faith in stethoscopic signs were not, at that time, (now nearly four years ago,) so strong as it has become since, placing little weight on that part of the investigation, and relying solely on other symptoms, could not bring themselves to

believe, that a large, splintered, and doubly fanged tooth, could find so easy an entrance through the rima glottidis, and lie in the trachea, or bronchial tube, without causing distress of a more urgent nature, than that complained of by the patient; seeing that so small a body as even a cherry stone, can produce so much disturbance there. The fit of coughing, induced at the moment of the accident, might, in their opinion, have been caused by a scratch of the tooth on the epiglottis, while passing through the pharynx into the œsophagus; and it was considered that the transient existence of this symptom, gave confirmation to such a view of the matter. Then, as to the feeling of uneasiness, and tendency to draw heavy sighs which the man complained of, they were accounted for by supposing them to have arisen more from the alarm produced by the marked attention paid to the patient, on account of the singularity of the accident, than from any serious injury he had sustained.

On the other hand, it was urged by those present who happened to be greater believers in the value of the stethoscope, that the fact of the respiratory murmur being feeble and indistinct in the right lung, whilst the sound on percussion thereon was equal to that produced by striking over the left, taken in connexion with the rattle in the lower part of the trachea and top of the right lung, indicated the existence of an obstructing body in the right bronchus. They were ready, however, to admit, that of these symptoms, no single one, nor indeed all taken together, could, of themselves be considered unequivocal evidence of the presence of the tooth in that situation; but, when viewed in conjunction with the other immediate consequences resulting from the operation, in an individual, too, previously in good health, viz. the sudden and certain disappearance of the tooth; the violent fit of coughing which occurred at the instant of its extraction; and the uncomfortable and oppressed state of breathing remaining after, all in their opinion seemed to demonstrate the presence of the suspected body, either in whole or in part in some of the air-passages, and

most probably in the right bronchial tube. The case, however, being of a very unique description, and the evidence in proof of the presence of the foreign body in the windpipe not being, in the minds of all, sufficiently decisive, it was determined, that for the present, no hazardous operation could, with propriety, be undertaken. The man was accordingly placed in hospital, in order that farther observations on his condition might be made.

Not having had from this period more than occasional interviews with the patient, as he had passed from under my care, and not being in full possession of the changes and treatment he underwent, I must content myself with stating, that he passed successively through the several stages of pneumonia, bronchitis, and pleuritis, first of the right, and secondarily of the left lung; that the early period of the illness having been allowed to pass over, without the performance of any operation for its relief, in consequence of the uncertainty and obscurity hanging over the case, it was deemed prudent not to make any unavailing attempt when the prospects of benefit from an operation had passed away; and finally, that he died on the eleventh day from the occurrence of the accident.

The great interest excited by this case on account of the novelty attached to it, and particularly on account of the difference of opinion respecting its nature, gave rise, of course, to a desire among all persons acquainted with its occurrence, to know the result of the post-mortem examination. Numbers were assembled to witness the opening of the body, when, unexpectedly, the friends refused their assent. No persuasion, no entreaty, no bribery, could change their determination; and accordingly the corpse was removed from the hospital. However, having watched the procession, and traced the body to the house in which it was laid, I at length, through the persuasion of the Rev. Mr. Brownrigg, and by his consenting to remain present, obtained leave to make the wished for examination.

The following is an account of the post-mortem, as noted down at the moment of its performance.

Examination sixteen hours after death.—When the anterior part of the chest was removed, and the pleura opened, the lungs retained their natural fulness; no collapse on either side took place. The right lung was adherent on every side to the parietes of the chest, except posteriorly, where a considerable quantity of thin bloody fluid lay between the pleuræ. The pleural cavity on the left side was also obliterated by an universal adhesion. The lymph effused between the pulmonary and costal pleuræ of the right lung was in considerable quantity, firm and opaque, and evidently of several days standing; that especially, where the fluid noticed above was lodged, for an extent of seven or eight inches, was very abundant and tenacious. The lymph which caused the adhesions on the left side was in smaller quantity, and appeared only as a thin semi-gelatinized stratum. In both, the pleura pulmonalis, when stripped of the artificial membrane, exhibited a highly vascular surface; on the base of the right lung it was red even to lividity. All the adhesions were, however, easily broken through, by pressure with the hand; they were obviously the product of the recent attack of inflammation.

The substance of the right lung was hepatized in every part; its structure readily gave way under pressure with the finger: and when cut into, the surfaces of the section discharged a quantity of serum and dark fluid blood. The left lung, though less advanced in disease, exhibited all the marks of intense inflammation, its integral structure was dense, heavy, and swollen with engorgement.

Such was the condition of the pleura and pulmonary tissue; the next and most interesting part of the dissection lay in the examination of the air-passages. On slitting open the trachea from the larynx down to the lung, the obnoxious tooth was discovered lying in the right bronchial tube, about one inch beyond its commencement; the fangs were directed to-

wards the lung, the broken crown looked up towards the larynx. The bone lay loose in the tube, and came away readily when caught between the points of the scissors. It had two long fangs, and when tested with the splinter, which had been broken off in the first attempt at its extraction, and presented to me by the man while alive, was found to fit most accurately to it, and make a perfect tooth.

1. The portion of tooth found in the lung, with the fragment at a short distance.
2. The tooth and fragment, of the natural size, joined together.

The mucous membrane of the air-passages, from the larynx to the finest ramifications all through both lungs, was in a state of intense inflammation ; it was tumid and softened in consistence, and of a deep red colour, as if injected, The tubes were occupied by a muco-purulent fluid ; but there was no abscess around the tooth, nor even did the structures in the immediate vicinity of the foreign body exhibit a much higher degree of inflammation than those which were more remote.

None of the organs in the chest presented any marks of the existence of previous disease. The pleuritic adhesions were not of longer standing than the period occupied in the course of the late fatal attack ; and there were neither tubercles, nor tubercular cavities in any part of either lung.

This case deserves to be recorded for several reasons :—*First*, on account of its rarity. *Secondly*, as it shows that a body, apparently much larger than the aperture of the rima glottidis, and one even of different form, can find a passage

through that fissure. *Thirdly*, because it proves that so obnoxious a foreign body as a full grown molar tooth may lie for a time in the windpipe, without being productive of much inconvenience. *Fourthly*, on account of the additional evidence which it supplies of the justness of Mr. Key's statement, that the right bronchus is the usual resting place for foreign bodies, which have passed the larynx. *Fifthly*, on account of the practical observations made soon after the accident on the state of the respiration, by percussion and the use of the stethoscope. And *sixthly*, because by the *sectio cadaveris*, the character of inflammatory action induced by the presence of a foreign body in the bronchial tubes is demonstrated.

Respecting the first of these positions, viz. the singularity of the case, nothing such to my knowledge is on record. It is probable that such an accident was never dreaded by any one setting about the extraction of a tooth: and as the like may never occur again, the registry of it may rather be placed among the "cas rares," than held out as a caution against the practice of tooth drawing.

Secondly: to understand aright how a body of greater apparent dimensions than the rima glottidis could have found a passage through that aperture, it is only necessary to reflect for a moment on the nature of the process of inspiration. The introduction of air to the lungs with every breath, is consequent upon the enlargement of the chest—the weight of the atmosphere pressing the adjacent column into the cavity with a rapidity proportioned to the suddenness and extent of the dilatation, and with a force sufficient to carry along in the current any light moveable body, which may happen to come in the way. A small body so intercepted, will readily pass with the air through the rima, and be lodged in a part of the tube lower down. A body of inordinate dimensions may stick so firmly in the aperture, that the full weight of the atmosphere is unequal to its propulsion onwards, and death from suffocation will be the inevitable consequence, if the foreign body be not

instantly shot back again by a powerful expiratory effort, or removed by operation. And, a body of intermediate size, viz. one of such moderate dimensions, as to be capable of passing through the rima, by stretching and divaricating the sides of that aperture, may, when pressed heavily by the atmosphere, as it would during a forced inspiration, be driven past the obstruction, and thence into the trachea or bronchial tubes.

Such latter was, no doubt, the mode by which the tooth in the case above related, found a passage into the bronchus. The man, holding his breath during all the time of the operation, suddenly at the moment in which the extraction was completed, took a full inspiration; upon which, the tooth, partly by its gravity, (the head being at the time thrown back,) and partly carried by the air rushing to the windpipe, fell over the aperture leading into that tube. The obstruction caused thereby to the further entrance of air, induced a spasmodic increase of action in the muscles of inspiration, and a consequent increase of pressure by the air at the opening, by which the tooth was driven with force through the fissure.

Thirdly: as to the freedom from pain or irritation from the presence of the foreign body, during the early part of the patient's illness, it constitutes an important fact to be borne in mind in making a diagnosis in such cases: the absence of this sign had certainly much influence on the diagnosis of the case in question. It has been long ago observed by Louis, and the accuracy of the observation has been since confirmed by others, that foreign bodies in the air passages produce more irritation when lying in the neighbourhood of the larynx, than when low down in the trachea; and that according as they are carried up or down by the air in breathing, so will the patients be afflicted with cough and dyspnoea, or have freedom from such sufferings. The accuracy of the observation receives additional proof from the history of this case. The tooth, a large heavy body, not admitting of elevation by the expired air, lay uninterruptedly in

the bottom of the trachea, and, as Louis significantly observes, "lay easy."

Fourthly: the case here related tends to confirm the opinion now generally entertained, that the right bronchus, in preference to the left, is that usually occupied by a foreign body carried by the air through the trachea. It was into this part that Mr. Key found a sixpence to drop, when let fall in the dead body through the rima glottidis; and it was here that he discovered the sixpence which caused the death of the individual whose case led to the performance of such experiments. The multiplication of proofs in favour of an important pathological fact, and one which may lead to greater accuracy of diagnosis, and greater precision in the performance of any operation, undertaken for the safety of human life, is of great value; and it is obvious, that such must be the tendency not only of Mr. Key's highly interesting communications, but of that just offered by me in corroboration of his statements. With respect to the possibility of saving, by an operation, the life of the individual in question, no more can at present be said, than that some attempt would most likely have been made, had the presence of the tooth in the right bronchus been clearly ascertained; and that the forceps recommended by Mr. Key, consisting of two long narrow blades, capable of being passed down the trachea through an artificial opening, might have been those to which a trial would have been given. It is clear, that the ordinary operation of making an opening in the wind-pipe, through which the offending body might be expelled by the efforts of expiration would not have been sufficient. The tooth should have been actually lifted from the right bronchial tube by mechanical means; otherwise its removal could not have been accomplished. The weight of the body would have opposed its elevation from the bronchus by any force which the expired air could exert upon it; and its size and irregularity of form would have been unfavourable to its discharge through such an opening as the calibre and connexions of the trachea would admit of.

Fifthly: the application of the stethoscope to the detection of foreign bodies in the air passages, is a recent improvement in the use of that valuable instrument. The absence of respiratory murmur in one lung during inspiration, when, by percussion, it is proved that the cells of the organ are healthy, and filled with air, is, in a case of this nature, a clear proof of the presence of an obstructing body in the bronchial tube leading to the affected organ ; and the circumscribed mucous rale, audible in the same place, may be considered as indicative of an increase of secretion, caused by the presence of the local irritation. These phenomena, so intelligible consequences of the accident, and so characteristic of its nature, were first observed in this city, in two patients in the Meath Hospital, and their presence alone justified and led to the performance of successful operations for tracheotomy.*

Sixthly: the pathological condition of the thoracic organs of this patient presented some points of interest. The morbid changes induced by the late inflammation, were not all of equal standing ; they had, on the contrary, commenced in different parts in succession, and might be traced as from a centre, referrible to the right bronchus the seat of the tooth—through the mucous membrane, pulmonary tissue and pleura, first of the right, and subsequently of the left lung, until all these textures were involved in the same disease. Ordinary instances of bronchitis induced by cold, are not prone to run rapidly into pneumonia, and much less to spread to the serous membrane covering the lung ; the case, however, appears to be very different where the inflammation of the mucous membrane is caused by the presence of a foreign body, as is shewn by the dissection of the lungs in the individual, the subject of this communication.

* These two highly interesting cases are recorded in the 5th vol. of the Dublin Hospital Reports, by Professor M'Namara.