present; but taking these five cases, we see three lives saved that would otherwise have been lost. The results of all the operations performed during the past fifteen months in London, shew rather more than one out of two successful; and I have no doubt that when the diagnosis of this disease is more perfect; when the operation is performed earlier; when all the steps of the operation are carefully done; when health is improved by diet and medicine before operation; and when the after treatment is thoroughly understood—then, and not till then, must we expect to be able to lay down any table of comparison. Let us, however, be encouraged by the experience of herniotomy, lithotomy, and lithotripsy, and the more recent amputations of the thigh; and, observing how improved treatment has told upon their statistics, let us confidently anticipate that surgery will yet triumph in ovariectomy, and thus benefit humanity.

17, Connaught Square, Hyde Park, May 1889.

REMARKS ON DR. INMAN'S PAPER "ON THE INFLUENCE OF VITALITY UPON SECRETION".

By JOHN KENT SPENDER, Esq., Surgeon to the Eastern Dispensary, Bath.

I HAVE read with considerable interest Dr. Inman's paper in the JOURNAL of April 30th, "On the Influence of Vitality upon Secretion". His observations embody much that has probably occurred to the thoughtful physiologist, though perhaps never before put into so intelligible and practical a form. But the question is at once suggested: Is not Dr. Inman confounding two essentially different processes—active and passive secretion? Active secretion is a sign and product of life, and is coincident with the activity of all the other organic processes. Passive secretion is almost entirely a physical act, and is independent of nerve-power: nay, it even goes on better when nerve-power is diminished or suspended. It scarcely deserves the name of a vital function at all; but I apprehend that it pretty accurately defines that phenomenon of which Dr. Inman has given so many appropriate illustrations.

In true secretion, we have three elements to bear in mind—the blood from which the secretion originally comes; the blood-vessel through which the secretion transudes; and the gland-structure which is the anatomical instrument for separating and eliminating it. Now, the most ultimate gland-structure always possesses the several constituents of mucous membrane; namely, areolar tissue, basement-membrane, and epithelial cells; and the special characters of the different secretions are usually said to depend upon the elective faculty with which these epithelial cells are endowed.

Active secretion being an index of present life and force, the epithelial cells are busy in the work; but the term passive secretion literally expresses the fact that the aqueous portion of the blood, and very little else, simply filters through the blood-vessels and gland-walls; and that vital agency has very little to do with it. For example, increased cutaneous perspiration is of two kinds—active, when it accompanies bodily exercise; passive, when it is the effect of exhausting diseases, and the prelude of death itself. In the former case, it is the symbol of augmented function; in the latter, it is merely that the diminished tone of the capillary walls allows the water of the blood to permeate them. Paralysis of the vaso-motor nerves, or any particular dyscrasia, produces the same result. I lately attended a case which illustrates this point. A child of seven years old had threatening mesenteric disease: her skin was cold and dry by day, and covered with profuse passive sweat at night. By alterative and tonic medicines, and a regulated diet, a constitutional improvement quickly ensued, and the passive sweat was stopped; and, in the course of a few weeks, the skin was constantly moistened with the warm dew of active perspiration.

A so-called diuretic drug may appear to exercise a marked effect in increasing the amount of urine; and, if the organic and inorganic principles of this secretion are increased in proportion to the aqueous constituent, it is a true instance of accelerated functional activity. But, in hysterical and nervous persons, who pass a large quantity of nearly colourless urine at a time, the haste with which the water filters through the Malpighian tufts leaves scarcely any time for it to be impregnated with the contents of the epithelial cells that line the uriniferous tubes, and which are the agents for imparting to

the urine its special characters. The act is less a vital than a physical one, and cannot with precision be termed a secretory process at all.

Pathology supplies us with numerous facts illustrative of the same distinction. The primary stages of bronchorrhoea, gonorrhoea, and diarrhoea, have particular features in common; and the exudative products of these forms of local inflammation have analogous appearances and qualities; but, if these inflammations become chronic in duration or asthenic in degree, the hyperæmia in which they severally originated is unnaturally prolonged, and this local blood-stasis causes a corresponding change in the nature of the exudations.

It is an old doctrine, that secretion is only a form of molecular nutrition; the tissue nourished being the epithelial cells, and the nutriment supplied to them that which is ultimately destined to be the secretion itself. This being granted, we have a right to assume that the influence of innervation is as much required for the formation and growth of gland-cells as for the ultimate elements of every other animal tissue. Consequently, when nerve-force is lessened, gland-cells cannot form and grow so rapidly, and the secretory product must be diminished in an equal ratio. Hence, whenever we have an apparently augmented secretion as the accompaniment or result of weakened power, we ought to regard it, not as an exaltation of a physiological act, but rather as a retrogression into the domain of purely physical processes.

ON UNUNITED FRACTURE.

By W. J. MOORE, Esq., H.M. Indian Medical Service, Bombay Establishment; formerly Senior Resident Surgeon at the Queen's Hospital, Birmingham.

UNLESS there be some constitutional cause, either already persistent, or the result of circumstances, as locality, situation, diet, etc., immediately after the accident, it will seldom happen that Nature's reparative process is insufficient to consolidate a fractured limb, treated with ordinary care both by attendant and patient. When such non-consolidation does happen, it must always be regarded as a grave and serious occurrence, and the more so the nearer the trunk it may be situated. Thus both as regards the inconvenience to the patient, and the difficulty and dangers attending attempts at cure or relief, the bones of the forearm or leg will give more anxiety to the surgeon than those of the foot or hand; and, again, in their turn the tibia, ulna, and radius, are less a cause for uneasiness than when the femur or humerus is the bone affected. This remark is not only true regarding operative attempts at cure, but applies with double force to those unfortunate cases where the state of the limb requires amputation as a *dernier resort*.

The bones in which false joints most frequently occur are according to the statistics collected by Mr. Norris, those of the thigh and arm (*American Journal of the Medical Sciences*, vol. xxix, 1842); but my own experience would lead me to infer that the occurrence took place at least as frequently in the bones of the forearm as in those of any other part of the frame. South (*Chelius*, p. 888) states that unnatural joints are most frequent in the upper arm; next, the femur would appear to be the one generally affected; and the tibia seems least liable to such result. This is, indeed, what one would, *a priori*, suppose to be the case, as it is evident that a broken leg can be kept in perfect apposition with greater ease and security than a broken thigh; and thus one source of unnatural joint does not act with the same frequency on the former part.

The causes of non-union of broken bones, and of unnatural and false joints, are numerous; but foremost may be mentioned a debilitated or cachectic condition of system. Sir Astley Cooper, in his work *On Fractures and Dislocations*, p. 568, observes: "In numerous instances, the failure of union may be traced to a defective state of the constitutional powers. This debility may arise from divers causes, such as bad food, habitual loss of blood, as from hæmorrhoids; residence in the impure localities or underground tenements of crowded cities. Malarious atmosphere will also produce a condition in which union is with difficulty obtained. This was exemplified in the case of a sailor under my care, when in medical charge of the naval station of Bassadore,* in the Persian Gulf, where the disposition to non-union was happily combated by a lengthened course of quinine and wine.

* For an account of Bassadore, see a paper by the author "On the Climate of the Persian Gulf", *Association Medical Journal*, November 1884.

The cachectic condition constituting scurvy, and the allied disease called beri-beri, has a manifest and powerful effect in retarding the consolidation of fracture. It may even cause absorption of a callus several months or years after its formation. This is mentioned by Erichsen (*Science and Art of Surgery*, p. 568), Dr. Guy (Hooper's *Practice of Physic*, p. 277), S. Cooper (*Surgical Dictionary*, p. 943), and other authors; while Armstrong, in his lately published work on *Naval Hygiene*, speaks of old wounds opening in such conditions. In Lord Anson's voyage round the world, when scurvy raged to such an extent that in one ship alone (the *Centurion*), in the latitude of the island of Juan Fernandez, forty-three men died during one month, and double that number during the next, it is stated that loosening of old fractured bones occurred in many instances (*Narrative of Lord Anson's Voyage Round the World*, pp. 33-142). One of these cases was that of a sailor, whose leg had been broken fifty years before, at the battle of the Boyne. An instance of the kind was witnessed on board the *Dreadnought*. The patient, while in China, broke one of his ribs, which united in the usual time. In the voyage home, he became scorbutic; the rib which had been broken became disunited; but, on the man's recovery from scurvy, it speedily united again (*Library of Medicine*, vol. v, p. 84).

In an American ship, to whose captain I paid a professional visit when on the Gulf station, in 1855, most of the crew were more or less affected with scurvy. Among them were two cases of non-union of fractured forearm, one of three months, the other of longer persistence. I was assured by one of the mates, who professed to be doctor also, that these fractures had been only placed in splints; that, in the one case, the arm grew firm; but, on the man becoming affected with scurvy, it ultimately became as I found it.

These debilitating causes may come into operation during the progress of cure, and will produce their result in the injured part; and, according to the anæmic state established, either a false joint properly so called, or a fibrous tissue possessing a low degree of vitality, will take the place of a healthy deposition of osseous material. It seems probable that, in very debilitated individuals, more or less of this fibrous tissue would always be the deposit; organisation not proceeding to the more complex condition of simulated synovial membrane, cartilage, and capsule. The simple condition of the bones being united by fibrous tissue also appears more susceptible of cure than when a false joint has been formed. This may easily be imagined, when it is considered that, in the one case, absorption to a considerable extent must occur; while, in the other, deposition is more required.

Undue movement during the stage of consolidation is supposed to be a frequent cause of non-union. Unless, however, there be a very considerable amount of interference with the quietude of the part, it seems improbable that this result would occur very frequently in a perfectly healthy constitution. The fractured clavicle, which can seldom be kept entirely motionless, unites; ossific deposit sometimes restores the broken acromion; and the rib, which is unavoidably in constant motion, unites, as Paget (*Surgical Pathology*, vol. i, p. 248) has shown, by the ensheathing or provisional callus—a mode of repair now known not to be so frequent in the bones of man as was formerly supposed. We may, therefore, conclude that, in the majority of instances (unless the limb has been moved about much more than is generally the case, at least in civil practice), non-union depends on some constitutional defect.

Pregnancy has been said to be a cause. I think, however, when non-union happens during this condition, it will be due to some of the causes inducing debility, or otherwise may be traced to want of care on the part of the patient or attendants. This was the opinion of Amesbury (*Practical Remarks on the Nature of Fracture*) and of S. Cooper (*Surgical Dictionary*, p. 943); but cases have been recorded of the occurrence. For instance, Alanson (*Med. Obser. and Inquiries*, vol. iv, No. 37) reports a case in which union was delayed during pregnancy, and took place after delivery; and Wardrop (*Med.-Chir. Trans.*, vol. v, p. 359) records another. Boyer (*Traité des Malad. Chirurg.*, p. 32) and Malgaigne (*Traité on Fractures*, p. 95) doubt if pregnancy be unfavourable to union. On the whole, the weight of evidence is against pregnancy being a cause *per se*; and the same may be said of suckling.

Advanced age does not appear to favour disunion, although it certainly is a cause of slow consolidation in occasional instances; but that it proves sufficient of itself to cause non-deposit of ossific matter, may well be doubted. Should, however, aged persons be placed in the same position, with regard to external circumstances, as the young and robust frequently

are, it appears not unreasonable to suppose that we should have a larger amount of ununited fractures occurring in elderly persons than is at present the case; for to the feebleness of old age would more readily be added the debility consequent on vitiated and tainted atmospheres. On this head, South observes: "In almost every ununited or imperfectly united fracture I have seen, the patient has scarcely, if at all, exceeded middle age."

Muscular action is given by systematic writers as a cause of non-union: as, for instance, in fractured femur, when the psoas and iliacus muscle acts upon the upper fragment; or, according to Mr. Butcher (*Dublin Quarterly Journal of Medical Science*, Feb. 1853), the lower fragment is drawn upwards and outwards; or when the muscles of the leg separate the fractured ends of the tibia widely apart; or, as Mr. Crompton (*Medical Gazette*, Nov. 15th, 1850) observes, in any case where the seat of fracture is near the insertion of a powerful muscle. This, however, can rarely be allowed to become a cause of non-union in the hands of an educated surgeon, although some degree of deformity, in spite of the best endeavours, particularly in the femur, will sometimes result; but I can easily imagine the graver accident of false joint occurring from the treatment of bone-setters and other pretenders, who flourish on their misdeeds and the credulity of the public.

In intracapsular fracture of the neck of the femur, the globular head, being detached from its vascular supply, may necrose. Therefore, want of supply of arterial blood may undoubtedly be a cause of want of union. If one fragment is so situated that a sufficient supply of blood is not afforded to it, not only will it refuse to throw out bony granulations, but it may likewise necrose. Erichsen (*Science and Art of Surgery*, p. 194) mentions, out of thirteen cases of ununited fracture of the humerus, nine were found to be situated above the canal in which the nutritious artery is lodged; the course of the vessel being from above downwards.

Diseases affecting the system, as gout, syphilis, and cancer, may have an influence in retarding union; but perhaps, except in their extreme stages, cannot be looked upon as definite causes, otherwise than as producing cachectic conditions. Every surgeon must have seen persons affected with secondary syphilis get well from fractured limbs; and a fracture I once saw, in a confirmed cancerous subject, consolidated in little more than the usual time.

Acute diseases, as fever and erysipelas, will delay consolidation; and perhaps, from the frequent movement which such cases are of necessity subjected to from delirium, restlessness, etc., false joints may result.

Loss of nervous influence may be a cause of non-union. Thus, a case occurred of injury of the back, palsy of the lower extremities, and fracture of the leg and arm. The latter united, but the former did not.

Malgaigne mentions disease of the bone near the seat of fracture as an occasional cause. Another class of cases in which non-union occurs are those where a portion of the bone becomes detached, dies, and remains as a foreign body between the ends of the fracture. In compound fracture, this is not an uncommon occurrence; and, of course, union will not take place until the removal of the dead bone has been effected.

Muscle may also get between the ends of the bones; but this would most likely be thinned and removed by absorption, unless sufficiently injured and detached to lose its vitality.

Bullets, pieces of cloth, and other extraneous matter, sometimes effect a lodgment. These latter, however, would generally be detected at the time of injury, and, if possible, removed.

Sir A. Cooper believed that non-union might sometimes result from the too long application of cold, in the shape of lotions or otherwise. He thought that the inflammatory action necessary for the reparative process might be thus checked. Malgaigne, amongst what he calls "local causes", also mentions moist applications, together with too early, too tight, too long bandaging, and premature use of the limb. Practically, however, under the judicious treatment employed by surgeons of the present day, these will seldom become causes: for instance, no person would think it necessary to continue the application of cold after the subsidence of pain and heat.

There is yet another peculiar state of system, which, although rarely occurring, will, I believe, in some instances, prevent true union taking place. I allude to mollities ossium, or malacosteon—a state which has been well described by Mr. Stanley as "an affection accompanied with softness of the bones and thinning of their walls, and with the accumulation

of adipose matter in their tubes and cells, with a preternatural excretion of phosphate of lime with the urine." (*Diseases of the Bones*, p. 237.)

A woman was under my care in 1851 for fracture of the tibia and fibula. The parts would not unite with any degree of firmness, and she afterwards became the subject of distorted pelvis and mollities ossium. Cases of this kind may be found in the *Institutes of Surgery* (vol. i, p. 370), and in Mr. Stanley's work on the bones.

It should, however, not be lost sight of, that the reverse has been known to occur. Mr. Toynbee, in *St. Thomas's Hospital Reports*, No. 1, states that, notwithstanding the unsoundness of the bones in this disease, union sometimes takes place not only at, but within, the customary period; and he gives the case of a man who had twenty-two fractures of long bones, all uniting without difficulty. Arnott (*Medical Gazette*, June 1833) and Bell (*Diseases of the Bones*, p. 71) also mention cases where union occurred in less than the usual time.

There are some localities in which fractured bones do not so readily unite; and, in illustration, may be mentioned the Persian Gulf, particularly the station of Bassadore, on the northern extremity of the poetically famed island of Kishna; some cantonments in northern India; and, as I have been informed, places on the African coast, and the southern States of America; the reason being probably the miasmatic state of the atmosphere.

Lastly, there are certain cases where non-union occurs, and for which we cannot assign any cause. The patient appears in good general health, neither affected with gout, scurvy, syphilis, or cancer; has not been exposed to malarious influences, or in any manner become debilitated, either previously to the accident or subsequently to that event. The fracture has been treated *secundum artem*; and yet a long period will pass before consolidation occurs, or the case will end in non-ossific union. Here we are obliged, as Fergusson justly observes, to refer it to "the usual resource of ignorance—a peculiarity of constitution." (*Practical Surgery*, Part I, p. 19.) Happily, such cases are small in number; but the amount occurring from several of the causes named is considerably larger, averaging, as I have reason to believe, one in about every three hundred and fifty fractures.

Although not of practical importance, still, as a matter of curiosity, it is worth noticing that by far the greater number of false joints occur in the male sex. Thus, out of one hundred and forty-seven cases mentioned by Mr. Norris, there were but four women; and the whole of the instances referred to by Malgaigne were men.

[To be continued.]

CASE OF EXTENSIVE MALIGNANT DISEASE OF THE ABDOMINAL VISCERA: OBSCURITY OF SYMPTOMS.

By WILLIAM DAVIES, Esq., York Town, Bagshot.

MR. J. R., hotel-keeper, aged 55, of fair sandy complexion, and somewhat inclined to corpulency, had always enjoyed pretty good health till the last year or two, with the exception of having now and then attacks of gout in the foot and biliary derangement, but for which affections he seldom put himself under medical treatment. He sent for me on the 27th of September last, in consequence of his having been suffering from pain in the lower and fore part and sides of the abdomen, recurring at indefinite intervals. He stated that he had not been well for some time; that he often felt sick and weary, nervous, and indifferent as to going about his business. His appetite was various and capricious. After eating, he felt distended, with occasional pains in the region of the stomach, flatulency, and heartburn; his bowels had not acted kindly, sometimes being constipated, at others relaxed. He complained a good deal in passing urine, which was usually loaded with an acid furfuraceous sediment. He was prescribed antacids and alteratives, which relieved him.

He shortly afterwards left home for a change, and I did not see him again till the beginning of December. At this time, he had evidently lost flesh, and his countenance was dull and sallow-looking, yet placid; but it gradually assumed that pinched and anxious expression, and that peculiar yellow hue, which are so characteristic of organic visceral disease. He now wasted fast. His chief complaint was of pain in the abdomen, below the navel, on each side, always present, but augmented in frequency to an extreme degree of severity. At length the epigastrium became tender, as well as painful, with a burning sensation in the stomach extending upwards towards

the throat, followed by nausea and heartburn. These symptoms slowly increased and advanced, till everything taken into the stomach was rejected some little time afterwards. Vomiting took place at intervals (particularly in the evening), of matters having different appearances: sometimes a green watery fluid and mucus; at others, that peculiar acid brown fluid like coffee-grounds, often mixed with undigested food; and, two or three weeks before his death, almost entirely feculent. He had frequent attacks of hiccup, which annoyed him considerably towards the last. The skin was sometimes hot, and usually dry, and imparted a roughish sensation to the touch; the tongue was always dry and clammy, and had a reddish fur in the centre; the bowels (as they almost always had been all along) were obstinately constive, and, towards the close of the disease, nothing could be elicited by evacuation or other means. The pulse varied from 70 to 100; it was small, thready, and feeble.

On April 16th, his memory began to fail; his reasoning powers sank rapidly; and, in the evening of Sunday, the 17th, he expired.

Many remedies were tried, which I do not particularise, as none of them gave him any sensible or continued relief.

POST MORTEM EXAMINATION. The whole body was emaciated and attenuated to the utmost degree. The abdominal parietes being reflected, a considerable quantity of a thick glairy fluid escaped from the cavity. Scarcely any omentum was observed on the bowels; the convolutions of the bowels presented a dark gangrenous appearance, and were agglutinated together by firm adhesive peritoneal inflammation. The liver was pale, atrophied, and of a friable granular texture; its peritoneal surface was almost universally adherent to the surrounding viscera; and a small granular tumour was found on the external surface of the large lobe. The gall-bladder was small and empty. The stomach was somewhat oblique in position, and unusually small, capable of holding only about a pint or so of fluid. On laying it open, about half or three-quarters of a pint of a thin yellow feculent fluid escaped. The cardiac end presented a normal appearance; the mucous membrane was soft and vascular, more especially towards its pyloric end, where the organ was increased in thickness, and the mucous membrane corrugated, and of a darkish hue. On cutting open the pylorus, a roughish grating feeling was communicated to the scalpel. The peritoneal coat around it was entire, but involved in the general thickening. A section of the pylorus, contracted in size, exhibited the characters of true scirrhus, which encircled it, and extended somewhat down the duodenum, which was congested and dark coloured. The pancreas and mesentery were much increased in size; they were very hard, and had lobulated masses of a carcinomatous growth, and were inseparably united to the surrounding viscera. On tracing the intestines, much difficulty was experienced by their softened condition and the firm adhesions between their convolutions and the mesentery. Several strictures, of various size and extent, were found in the course of the small intestines, which were much distended above and below, and contained dry hardened masses of feculent matter. The cæcum was smaller in calibre than usual. The caput coli was very considerably enlarged. Three strictures were observed; one in the ascending, and two in the descending portions of the colon. A stricture was also found, of a scirrhus character, encircling the rectum, about six inches from the anus. The spleen was healthy; as was also the right kidney. The left kidney was enlarged and soft, exhibiting fatty degeneration. The bladder was healthy, and contained about a pint of urine.

REMARKS. This case is a very interesting one, from the general abdominal viscera being involved in disease, while the premonitory symptoms were extremely obscure, appearing at first to be simply those of ordinary dyspepsia, no attention having been paid to them by the patient, who, although impaired in health and strength, was able to get out and about tolerably well. When the symptoms became aggravated, he was anxious for further advice, and took the opinion of other medical men, two of whom are of some eminence in the profession, but each gave a different diagnosis. However, as the disease advanced and emaciation increased, accompanied by that peculiar sallow hue of complexion, a general restlessness, and anxious expression, with sickness recurring some time after taking food, as well as the nature of the egesta, no doubt could remain as to the existence of extensive malignant organic disease in the stomach and intestines. Very little could be done in a case of the kind, beyond administering palliatives and sedatives.