REMARKS

ON THE

ANTISEPTIC SYSTEM OF TREATMENT IN SURGERY.*

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Case of Ligation of the External Iliac Artery on the Antiseptic System (continued).—The case of ligation of the external iliac artery on the antiseptic system for femoral aneurism, related in a former number of this JOURNAL (August 1st, 1868), has since afforded the opportunity of ascertaining the results of such an operation at a late period after its performance. The vessel having been tied on January 30th, 1868, the patient continued for about ten months in fair health and strength, but in the latter part of November became affected with a peculiar spasmodic disorder of the respiration, and on the morning of the 30th of the month, while sitting up in bed, suddenly exclaimed that something had given way within her and that she was dying, and then immediately expired. Next day I made a *post mortem* examination in the presence of Dr. Fergus, when the idea which she had expressed proved correct; an aneurism of the descending part of the arch of the aorta having given way and discharged an enormous quantity of blood into the mediastinal and subpleural cellular tissue. The parts concerned in the operation having been removed and dissected, the following appearances were disclosed. The aneurism was not entirely obliterated, but remained about the size of a cherry or large filbert, of somewhat fusiform shape. The upper two-thirds were solid, being occupied by firm coagulum incorporated with the sac. The lower third, situated just at the bifurcation of the common femoral, had been kept free from coagulation by the regurgitant stream of blood from the profunda into the superficial trunk. This part of the sac appeared constituted by the wall of the vessel, very slightly distended. The external iliac artery was considerably shrunk throughout, and tapered from each end to near the middle, where it was only about one-twentieth of an inch in diameter. In the greater part of its length the structure of the dwindled vessel could be distinctly recognised, with adherent coagula in the interior, decolorised and otherwise altered. But at the narrowest part the artery was reduced to mere fibrous tissue, constituting a dense white band five-eighths of an inch long, from the middle of which was seen projecting at one side a round buff-coloured appendage about a line in diameter, somewhat obscured by a trifling amount of inflammatory condensation of texture in the immediate vicinity. On scratching this little body with the point of a knife, I found it to be a very thin-walled capsule containing the knot of the ligature, with two tapering ends which were shorter than the thread was cut at the operation, while the noose had vanished altogether. The surface of the knot also showed clear indications of having been subjected to an eroding agency, similar, no doubt, to that exerted by granulations upon dead bone absorbed by them. (*Lancet*, March 23, 1867). Besides the remnant of the ligature, the tiny capsule contained a minute quantity of yellowish semi-fluid material, looking to the naked eye like very thick pus. Under the microscope, however, pus-corpuscles were seen to form but a small proportion of its constituents, which were principally rounded corpuscles of smaller size, and fibro-plastic corpuscles, together with some imperfect fibres and granular material. In addition to these elements were some which at first puzzled me, but which turned out to be fragments of silk fibre, of various lengths, and of jagged, tapering, or otherwise irregular forms, and many of them greatly reduced in thickness, contrasting strongly with the uniform bands of a fresh piece of silk from the same reel that had furnished the ligature. (Fig. 1.)

Mingled with the puriform fluid were also some delicate filaments of silk, visible without the microscope; and these seemed to retain their natural elasticity. Nor was there anything about the more minute pieces into which the fibres had been so strangely chopped up, to indicate that they were undergoing a process of solution or softening by the fluid that soaked the thread. They had rather the appearance of having been superficially nibbled, so to speak; confirming the impression conveyed by the naked-eye characters of the knot, that the silk had been eroded

by the absorbing action of the surrounding parts. Indeed, considering the organic origin of silk, the remarkable thing seems to be, not that it should be absorbed by the living tissues, but that it should resist their influence so long.

Why it was that the parts in immediate contact with the silk should

Fig. 1.—Constituents of the incipient abscess(?) around the remains of the silk ligature. Magnified 500 diameters. From a camera lucida sketch. A, a pus corpuscle; B, rounded corpuscles of smaller size; C, fibro-plastic corpuscle with endogenous cell-development; D, ordinary fibro-plastic corpuscles; E, irregular fragments of silk fibre partially absorbed; F, a portion of fresh silk fibre introduced for comparison.

have assumed so imperfect a structure is a difficult question, but one of great interest, because, although that structure could not be called actual pus, it was certainly a very near approach to it, and it is impossible to say that we had not here an incipient abscess. There can be no doubt that the presence of the thread was in some way or other the cause; and I think we can hardly be wrong in assuming that, in order to give rise to such degeneration of tissue, it must have operated as a persistent, if trifling, source of abnormal stimulation. Now, as putrefaction is here out of the question, and as the substance of silk is not chemically stimulating, we seem shut up to the conclusion that the thread must have occasioned disturbance of a mechanical nature. Further, the effect in question seems to be essentially connected with the disintegration of the silk. For, in the horse's carotid (*BRITISH MEDICAL JOURNAL*, Aug. 1st, 1868), the silk ligature, having remained unaltered during the six weeks that had passed after the operation, was found surrounded on all sides by compact tissue; and, in the present case, so long a period as ten months having elapsed before the puriform condition was observed in an apparently incipient stage, it is probable that the thread had lain for a long time inert, producing irritation only when partially absorbed. If, then, we inquire how the disintegrating silk could prove a source of mechanical irritation, it seems not improbable that it may have been from the sharp and jagged fragments of the fibre perpetually fretting the elements of the living tissue around them. This view, if correct, would explain the curious fact observed by Lawrence and others, that, when fine silk ligatures had been left with short cut ends in a stump, though the wound might heal without their separation in the first instance, they were liable to make their appearance subsequently; sometimes at so late a period as seems to exclude the idea of putrefaction having occurred from organisms introduced in the threads. Indeed, such ligatures occasionally shewed themselves encapsuled in little nodules in the cicatrix, without suppuration occurring at all. (*Cooper's Surgical Dictionary*, 7th edit., article Aneurism). In other words, the apparently soft silk, instead of remaining

* Continued from page 515 of JOURNAL for November 14th, 1868.

like a smooth leaden pellet permanently imbedded in the place where it was first introduced, made its way to the surface with or without suppuration, like a sharp spiculum of rigid glass; the silk being in its minute structure comparable to lead when in the primitive condition of smooth continuous fibres, and to glass spicula when in the form of jagged fragments, as the result of partial absorption. But, whatever may be thought of this explanation, it is clear that, if there is any chance of silk, though used antiseptically, giving rise, even in exceptional cases, to abscess in the vicinity of an artery tied with it, this is a serious objection to its employment. And, as the near approach to suppuration in this instance was undoubtedly occasioned by the persistent presence of the thread, the case, while interesting as affording evidence that silk is susceptible of absorption, suggests the expediency of substituting for that material some other substance which can be more readily taken up by the tissues. The use of "animal ligatures" of cat-gut, leather, or tendon, was long since tried, and abandoned as unsatisfactory; (Cooper's *Surgical Dictionary*, seventh edition, articles, Aneurism and Ligature); but, after the experience which the antiseptic system has afforded of the disappearance without suppuration of large dead pieces of skin and other textures, there could be little doubt that threads of animal tissue, if applied antiseptically, would be similarly disposed of. And, even if chemical processes should have been used in preparing such threads, it did not seem likely that this would interfere with their absorption; for I knew that the free action of carbolic acid on blood and sloughs had no such deterring influence, and I have long been satisfied that the injection of a strong solution of perchloride of iron or tannic acid for the cure of *naevi* produces subcutaneous sloughs which combine with the ingredient injected, and yet disappear as a rule without the formation of pus.

In order to put the antiseptic animal ligature fairly to the test, I made the following experiment.

Ligature of the Carotid Artery in the Calf on the Antiseptic System, with Threads composed of Animal Tissue.—On December 31st, 1868, I tied the right carotid artery about the middle of the neck in a healthy calf a few days old, the animal being under chloroform. Ligatures of two different kinds were employed, at an interval of about an inch and half, the sheath of the vessel being left undisturbed in the intervening part. The cardiac ligature was of home manufacture, composed of three strips of peritoneum from the small intestine of an ox, firmly twisted together into a three-fold cord. The distal thread was of fine cat-gut, called "minikin gut" by the London makers. Both had been soaked for four hours in a saturated watery solution of carbolic acid, which swelled and softened them, so that the thread of my own making was too large to enter the eye of the aneurism-needle except near the ends, where it was thinner than elsewhere. This substantial ligature bore the strain of tying well; but the fine cat-gut broke as I tightened the noose. I did not, however, remove it, but, having a second piece at my disposal, passed it round at the same place, and with gentle traction completed the knot. There were thus two ligatures of the fine gut at the distal site. All were cut short, except one end of the cat-gut, which I purposely left about three quarters of an inch long, to give a better opportunity of ascertaining what would become of the foreign material. The antiseptic arrangements were as follows. Before the operation the hair of the part was cut short, and a solution of carbolic acid in four parts of linseed oil (preferred for its cheapness) was rubbed well into the skin to destroy any putrefactive organisms lying among the roots of the hairs; for any so situated might escape the action of the external antiseptic dressing, and communicate putrefaction to the discharges, and thence to the interior of the wound. The sponges used in the operation were wrung out of a watery solution of the acid (1 to 40), and all instruments introduced into the wound, together with the fingers of my left hand and the copper wire used for sutures, were treated with the same lotion, some of which was poured into the wound after the introduction of the last stitch, at one of the intervals left for the escape of discharge, to make sure against the chance of any fresh blood which had oozed out during the process of stitching having regurgitated and taken living germs in with it. The external dressing was a towel saturated with the oily solution, folded as broad as the length of the neck, round which it was wrapped so as to extend freely beyond the wound in all directions, and prevented from slipping backward and forward by being stitched to a halter round the head and a girth behind the fore-legs, while a bandage rolled round it kept it applied accurately to the surface. A sheet of gutta-percha tissue to prevent contamination of the antiseptic towel from without, and another roller, completed the dressing; and a "cradle" was placed upon the neck to check lateral movements which might disturb it. I have described these particulars because I am more and more convinced of the necessity for scrupulous attention to details such as the germ theory dictates, in order to attain anything like uniformity of successful results.

A few ounces of the oily solution were poured daily on the towel for the first week, after which the dressings were left untouched for three days, and then entirely removed. The wound was found quite dry and free from tenderness, and the cloth showed only a superficial bloody stain. The stitches being taken out, a drop of pus escaped from the track of the suture next the head; but this was the only appearance of suppuration in the case from first to last, and, on the separation of the scabs a few days later, a sound cicatrix was disclosed. A month (thirty days) after the operation the animal, which had continued in perfect health, was killed, and the soft parts of the neck below the spine were removed for examination. On dissection, I was struck with the entire absence of inflammatory thickening in the vicinity of the vessel, the cellular tissue being of perfectly normal softness and laxity. But, on exposing the artery itself, I was at first much disappointed to see the ligatures still there to all appearance as large as ever. But, had I borne in mind what I had observed in some of my earlier cases of compound fracture treated antiseptically, I should have been prepared to find these threads present in appearance, though absent in reality. It may be well for me to quote from the account I have given elsewhere of one of these cases. (*Lancet*, March 1867, page 328). It was a compound fracture of the leg produced by direct violence, with a wound of considerable size, and a great deal of extravasation of blood into the limb. In accordance with the practice which I then followed, a piece of lint, soaked with undiluted carbolic acid, had been placed over the wound, and had formed with the blood a firm crust. "Nearly three weeks after the accident, I was detaching a portion of the adherent crust from the surface of the vascular structure into which the extravasated blood beneath had been converted by the process of organisation, when I exposed a little spherical cavity about as big as a pea, containing brown serum, forming a sort of pocket in the living tissues, which, when scraped with the edge of knife, bled even at the very margin of the cavity. This appearance showed that the deeper portions of the crust itself had been converted into living tissue. For cavities formed during the process of aggregation, like those with clear liquid contents in a Gruyère cheese, occur in the grumous mass which results from the action of carbolic acid upon blood; and that which I had exposed had evidently been one of these, though its walls were now alive and vascular." Thus the dead but nutritious mass had served as a mould for the formation of new tissue, the growing elements of which had replaced the materials absorbed, so as to constitute a living solid of the same form.

Hence it might have been anticipated that the ligatures of peritoneum and cat-gut placed on the calf's carotid would, after the expiration of a month, be found transformed into bands of living tissue. Such was, in truth, the case, as was apparent on closer examination. They had, indeed, a deceptive resemblance to their former condition, from the persistence in their substance of the impurities of the original materials, the dark, adventitious particles being of mineral nature, incapable of absorption, so that they had remained as a sort of tattooing of the new structure. Nevertheless, a marked alteration in colour had taken place, especially in the distal ligature, where the dirty grey of the softened cat-gut had changed to a dirty pink tint. The two pieces of cat-gut which had been tied round the vessel at that part had become, as it were, fused together into a single fleshy band, inseparably blended together with the external coat of the artery. The knots were nowhere discoverable; and the only indication of the end which had been left long at the time of the operation, was the presence of a black speck here and there upon a delicate thread of cellular tissue in connection with the vessel. The cardiac ligature was in like manner continuous in structure with the arterial wall. The short-cut ends had disappeared, but the massive knot was represented by a soft, smooth lump, which appeared at first entirely homogeneous, except that it was speckled with dark particles, as before referred to. On section, however, I discovered in the interior of the mass, and lying close to the wall of the artery, a small residual portion of the original knot, of comparatively firm consistence, and with the three-fold twisted character of the cord plainly visible. It was quite distinct from the living tissue that surrounded it, so that it could be readily picked out from its bed with a pair of needles. A slender and irregular remnant of the noose was also found lying in a sort of tubular cavity, extending about half round the vessel. Thus the process of organisation had not yet quite invaded the entire thickness of the foreign solid; and it was a happy circumstance that the cord had been so constructed that the distinction between the old structure and the new could be plainly recognised.

Ample as was the evidence afforded to the naked eye of the organisation of the ligatures, it was satisfactory to find it confirmed in the clearest manner by the microscope. A piece of the knot having been teased out with needles in a drop of water, presented, like a fresh piece of peritoneum, the wavy bundles of parallel fibres characteristic of perfectly developed fibrous tissue. Adhering to the surface of the remnant

of the ligature was some soft, opaque material, readily washed off with water, consisting of corpuscles of different forms, most of them caudate, or fibro-plastic, but some spherical, though not resembling those of pus, and here and there fragments of the original peritoneal tissue, affected more or less with interstitial cell-development. At a short distance from the remains of the old thread, the fleshy material which had been formed at its expense proved to be a most beautiful example of fibro-plastic structure, the coarse fibres which mainly constituted it being composed of very large elongated cells, containing several nuclei, and presenting in their course branchings and thickenings of various forms, as represented in the sketch given below. (Fig. 3.) Here and there were seen

Fig. 2.—The vessel seen in longitudinal section. Magnified three diameters.

From a camera lucida sketch. A. The artery to the cardiac side of the ligature, kept free from clot by the stream of blood through the branch, B. C. Coagulum filling the artery to the distal side of the ligature, F. F'. D. The middle and internal coats, somewhat thickened and blended together within the grasp of the ligature. E. The external coat continuous in structure with the organised ligature.

fibres more perfectly formed, and also cells of more rudimentary character. Again, the band which had resulted from the organisation of the two fine threads of cat-gut, which, from the smallness of their bulk, had no doubt vanished early, having had longer time to perfect its structure, was a comparatively well-developed form of fibrous tissue, consisting of coarse fibres rather than of elongated cells, being thus intermediate between the merely fibro-plastic material of more recent growth, and the completed texture of the original thread. For it is to be remarked that a piece of cat-gut exhibits, under the microscope, abundance of perfect fibrous tissue. A more favourable period for the investigation, with a view to establishing the nature of the change which ligatures of animal tissue experience under antiseptic management, could hardly have been selected.

Between the parts tied, the calibre of the artery was occupied by adherent coagulum, which was for the most part decolourised, and exhibited, under the microscope, fibro-plastic cells of irregular forms. A similar clot was present between the distal ligature and a small branch that arose about a quarter of an inch beyond it. But between the proximal ligature and the heart, the formation of a coagulum had been entirely prevented by a large vessel taking origin immediately above the part tied, which had thus borne, for a month, the full brunt of the powerful cardiac impulse in this large arterial trunk. Yet the vessel, so far from showing any sign of giving way, as it would inevitably have done had it been tied in such a situation without antiseptic precautions, appeared to have been but imperfectly ruptured by the soft and substantial ligature. The encircling ring of new tissue, incorporated with the arterial wall, must have had a corroborative effect; and within its grasp the inner coats, which seemed to have been but imperfectly ruptured by the soft and substantial ligature, were considerably thickened, and had coalesced, so as to form a strong *cul-de-sac*, the irregularities of which had been smoothed over by a little fibrinous deposit, which had acquired the characters of a firm fibrous tissue, and presented a free surface, undistinguishable from that of the lining membrane of the artery. (Fig. 2.) At the situation of the distal ligature, the structure of the vessel seemed entirely unaffected. The middle coat was seen in longitudinal section as a pink streak between two white lines, representing the external and internal tunics, neither thicker nor thinner than in neighbouring parts. The cat-gut threads had been tied too gently to produce rupture of the internal and middle layers; and their presence, and the constriction which they occasioned (whatever may have been their effect in the first instance), had left no permanent marks of disturbance; while the fleshy band that had replaced them, though in time it would, doubtless, have dwindled to an insignificant filament, was at least a temporary addition to the strength of the artery.

These appearances at the distal ligature are calculated to revive, under a new aspect, the question whether it would not be better always to avoid rupture of the internal and middle coats, which could easily be done by using a rather thick piece of catgut, softened by steeping it in

a watery solution of carbolic acid. In this way, the wall of the vessel would be left from first to last entirely intact. This, however, is probably a matter of indifference. Indeed, judging from the condition of the artery at the cardiac ligature, the injury done to the vessel at the outset by tight tying seems to lead to changes which increase its power of resistance, which was certainly severely tested in the present instance.

Fig. 3.—Some of the elements of the fibro-plastic structure of the organised peritoneal ligature at the knot F. From a camera lucida sketch. Magnified 500 diameters.

It appears then that, by applying a ligature of animal tissue antiseptically upon an artery, whether tightly or gently, we virtually surround it with a ring of living tissue, and strengthen the vessel where we obstruct it. The surgeon, therefore, may now tie an arterial trunk in its continuity close to a large branch, secure alike against secondary hæmorrhage and deep-seated suppuration, provided always that he has so studied the principles of the antiseptic system, and so carefully considered the details of the mode of dressing best adapted to the particular case in hand, that he can feel certain of avoiding putrefaction in the wound. For my own part, I should now, without hesitation, undertake ligature of the innominate, believing that it would prove a very safe procedure.

Cat-gut, manufactured from the small intestine of the sheep,* may be had at a very low price, from the thickness of a horsehair upwards. In the dry state, it is somewhat objectionable from its rigidity, and also from a tendency of the first half of the knot to slip before the second half is secured. Water renders it perfectly supple, and as little liable to slip as waxed silk. But if a watery solution of carbolic acid be used for the purpose of making it antiseptic, the protracted immersion requisite to ensure completeness of the effect makes the finer kinds too weak and the stouter too clumsy, and will not enter the eye of an ordinary aneurism-needle. The method which I have found to answer best is to keep the cat-gut steeping in a solution of carbolic acid in five parts of olive-oil, with a very small quantity of water diffused through it. A larger proportion of the acid would impair the tenacity of the thread. If a mere oily solution be employed, the gut remains rigid, the oil not entering at all into its substance. But a very small quantity of water, such as the acid enables the oil to dissolve, renders the gut

* I need hardly remark that cat-gut is of a totally different nature from the so-called silk worm gut, which is in reality unspun silk.

supple, without making it materially weaker or thicker. And, curiously enough, the presence of this small amount of water in the oily solution gradually brings about a change in the gut, indicated by a deep brown colour, after which it may be placed in a watery solution for a long time, without swelling as a portion prepared in a simple oily solution does. This is a great convenience. For an oily solution is unpleasant to work with during an operation; and exposure to the air soon renders gut supplied with water rigid from drying. But, when it has been treated in the way above recommended, it may be transferred to a watery solution at the commencement of an operation, and so kept supple without having its strength or thickness altered.

For tying an arterial trunk in its continuity, cat-gut as thick when dry as ordinary purse-silk will be found best; but for ordinary wounds, where, if one ligature happen to break, another can be easily applied, much finer kinds may be employed, and are convenient from their smaller bulk. For every-day use, a small oil-tight capsule may be carried in the pocket-case; and this case can be replenished from a larger stock as may be necessary. I have had a small silver bottle with well-fitting screwed top adapted to my caustic-case; and this contains two little rods of wood with gut of two sizes wound upon them, together with a few drops of the antiseptic oil: and now that torsion has almost entirely superseded the ligature in ordinary wounds, this small supply will probably last me for months.

SUPPLEMENT TO HECKER'S HISTORY OF THE BLACK DEATH.

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THE progress of "The Black Death" has been traced, with great learning and ability, by Dr. J. F. C. Hecker, in his history of *The Epidemics of the Middle Ages*, first published in 1832, translated by the late Dr. B. G. Babington, and reprinted by the original Sydenham Society in 1846. Much information is given respecting the pestilence as it prevailed in England; but all we learn from Dr. Hecker of its further progress westward is, that "Ireland was much less heavily visited than England. The disease seems to have scarcely reached the mountainous districts of that kingdom." (P. 27.)

It is no disparagement to the learning of the author that he was unacquainted with the only particular account of the pestilence in Ireland which has been preserved; for the annals, from which I am about to quote, were first printed in the year 1849. The following brief notices of the pestilence occur in other Irish annalists:

"1348. Mortalitas magna et pestilencia in Hibernia." (Dowling.)

"Pestis maxima in Hibernia, quæ ante alias regiones pervaserat" (Grace). This paragraph is entered between one dated 1347 and another dated 1349.

"A.D. 1348. There was a general plague in Moylurg [in the county of Roscommon], and all Ireland in general, whereof the Earle of Ulster's grandchild died: also Mathew mac Cahall O Roysck died of it." (Mageoghegan's version of the *Annals of Clonmacnois*.)

"The Age of Christ 1349. A great plague [raged] in Ireland, and more especially in Moylurg, by which great numbers were carried off. Matthew, the son of Cathal O Rourke, died of this plague." (*Annals of the Four Masters*, translated by Dr. O'Donovan.) The error of one year in the chronology of the Four Masters is well known to Irish scholars.

One other annalist, John Clyn of Kilkenny, has given the following description of the epidemic, which not only agrees with the accounts of eye-witnesses in other countries, but affords many additional particulars of the ravages of the pestilence in the most western part of Europe, which, I trust, will be acceptable to the members of the medical profession who possess Dr. Hecker's classical work.

"1348. Item, hoc anno et maxime mense Septembris et Octobris convenerunt undique de diversis partibus Hibernie, episcopi et prelati, viri ecclesiastici et religiosi, magnates et alii, et comuniter omnes utriusque sexus ad peregrinationem et vadacionem aque de Thaht-Molyngis, turmatim et in multitudine, sic ut multa milia hominum simul illuc multis diebus convenire videres, quidam venerunt devocionis affectu, alii (sed plures) pestilencie metu, que tunc nimis invaluit, que primo juxta Dubliniam apud Howht [Dalkey—in *margin*] et Drovda incepit, ipsas civitates Dubliniam et Drovda fere destruxit et vastavit incolis et hominibus. Ita ut in Dublinia tantum, a principio Augusti usque nativitatem Domini xliij. milia hominum mortui sunt, hec pestilencia ab oriente ut dicebatur incepit, et per incredulos et Saracenos transiens, de eis octo milia legiones hominum interfecit.—

"Non est auditum a principio seculi tot homines pestilencia, fame aut quacunque infirmitate tanto tempore mortuos in orbe; nam terre motus, qui per miliaria multa se extendebat, civitates, villas et castra subvertebat absorbebat et subversit; pestis ista villas, civitates, castra et oppida homine habitatore omnino privavit, ut vix esset qui in eis habitaret, ista pestilencia sic erat contagiosa quod tangentes mortuos vel inde infirmos incontinentiter et inficiebantur et moriebantur, et confitens et confessor simul ducebantur ad sepulchrum. Et pre timore et horrore, pietatis opera et misericordie, videlicet, visitare infirmos et mortuos sepellire, homines exercere vix audebant. Nam multi ex antraxe et ex apostematibus, et pustulis que creverunt in tibiis et sub asellis [axillis], alii ex passione capitis et quasi in frenesim versi, alii spuendo sanguinem moriebantur. Iste annus fuit ultra modum consuetum mirabilis insolitus et in multis prodigiosus, fertilis tamen satis et habundans, etsi, morbidus et mortalis. In conventu Minorum de Drouda xxv. et in Dublinia apud eosdem xxliij. fratres mortui sunt, ante usque Natale.—

"Ista pestilencia apud Kilkenniam in xla invaluit, nam vito. die Marci viii Fratres Predicatores infra diem Natalem obierunt, vix [in] domo unus tantum moriebatur, sed communiter vir et uxor cum natis eorum et familia unam viam, scilicet mortis, transierunt. Ego autem frater Johannes Clyn de Ordine Minorum et conventu Kilkennie hec notabilia facta, que tempore meo acciderunt, in hoc libro scripsi, que oculata fide vel fide digno relatu didici, et ne gesta notabilia cum tempore perirent et a memoria recederent futurorum, videns hec multa mala et mundum totum quasi in maligno positum, inter mortuos mortem expectens donec veniat, sicut veraciter audivi et examinaui sic in scripturam redegei, et ne scriptura cum scriptore pereat, et opus simul cum operario deficiat, dimitto pergamenam pro opere continuando, si forte in futuro homo superstes remaneat, an aliquis de genere Ade hanc pestilenciam possit evadere et opus continuare inceptum." (*Annals of Ireland*, by Friar John Clyn. Printed for the Irish Archaeological Society, 1849.)

"1349. In magna karistia sere et specierum, nam libra sere vendebatur xxii. denariis, et piperis et zinsiberis xla denariis. Item, In festo Molingi episcopi, dominus Fulco de la Frene confidens in promissionibus falacibus Hibernicorum interficitur prodiciose."

The main facts of Clyn's account are, that in the months of September and October 1348, a great multitude of persons congregated at the monastery of St. Moling, in the county of Carlow, many of whom fled from the pestilence, which first appeared about nine miles south of Dublin, at Dalkey, the usual landing-place of persons coming to Dublin from England. It destroyed almost all the inhabitants of Drogheda and Dublin: in the latter city, fourteen thousand persons died between the beginning of August and Christmas Day; twenty-five monks died in Drogheda, and twenty-three in Dublin. The pestilence raged in Kilkenny during Lent; and on the 6th of March, 1348 (old style), eight friars died in one day. According to the *Annals of the Four Masters*, "A great plague [raged] in Ireland, and more especially in Moylurg," in the county of Roscommon.

It rarely happened that only one person died in one house, but commonly the entire family. The plague was so contagious that those who touched the sick or the dead died immediately. The confessor and the confessor were buried at the same time. Men scarcely dared to visit the sick or to bury the dead. Many were affected with anthrax and abscesses, and with pustules, which formed on the legs and in the armpits. Some died in a state of frenzy, and others from spitting of blood.

So far, Clyn agrees with the accounts collected by Hecker; and, compared with other Irish annalists, he was well informed respecting the progress of the plague on the Continent. In his account of the pestilence which commenced at Avignon in January 1348,* he records that Pope Clement VI "ordinavit unum cimiterium novum consecrari, in quo mortui ex clade pestilencie interfecti recondentur. Ita ut a mense Maii usque Sancti Thome translationem (July 7th) quinquaginta milia et eo amplius corpora sunt sepulta in eodem cimiterio." This "unum cimiterium novum" was nothing less than the river Rhone itself, into which the bodies were flung; yet, by reason of that solemn benediction of the river, they were considered to receive Christian burial. This circumstance explains the surprising statement of Clyn, that more than fifty thousand bodies were interred in the new cemetery within sixty-eight days.

The last entry in Clyn's annals is for the year 1349, in which is mentioned the treacherous murder of Fulco de la Frene, "in festo Molingi episcopii," viz., the 17th of June. The compiler of these annals, who wrote "inter mortuos mortem expectens," seems to have fallen a victim to the pestilence about this time, and the parchment which he provided for the continuance of his work was applied to some other purpose. At the end of the MS. from which the text has been printed the transcriber wrote, "Videtur quod author hic obiit."

* In 1682, Sir William Petty estimated the entire population of Dublin, within and without the city walls, to be 69,090.

* This particular date, not mentioned by Hecker, is important, because we learn from it that the pestilence reached Ireland in about six months afterwards.