THE APPLICATION OF FUNGI AS STYPTICS.

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SEVERAL species of fungus were largely used in former times as applications for arresting haemorrhage, both by surgeons and the common people.

Dioscorides¹ mentions agaric (*ἀγρικός*) as a fungus springing from the trunks of rotting trees, and states that three obols of it taken with water stays spitting of blood. The fungus was so-called because it was found at Agaria, in Sarmatia. Linnaeus in his classification of plants adopted the Latin term *Agaricus* for a large genus of fungi. But in pharmacy now the name "agaric" is usually given to various corky species of *Polyporus* growing on trees—as the *P. officinalis*, chiefly found on the larch, the *P. fomentarius* on the oak and birch, and the *P. ignarius* on the willow, plum, and cherry. During the eighteenth century the agaric of oak was often laid on bleeding wounds by French surgeons. Audouillet applied pieces to the mouths of bleeding vessels after several capital amputations with good results. It was also used successfully for checking bleeding by James Ford, a Bristol surgeon. Some differences of opinion were expressed as to how it acted.

Ford took the view that its effect was more due to its soft porous texture than to any specific styptic action, and then employed in its place a fungus, very similar to it in substance, that grows abundantly on casks in wine vaults. Afterwards he wrote an account of the success of agaric and the *Fungus vinosus* in amputations. Oak agaric was so much used in surgery as to be called "surgeons' agaric." It was gathered in autumn, and, the outer rind being removed, the yellow-brown substance within was cut into slices, which were beaten with a hammer to make them soft and pliable. No precautions seem to have been taken to render them aseptic, although fungi, it is well known, are often infested with the larvae of insects.

Agaric was highly commended in 1788 by Buchan,² in his *Domestic Medicine*, as a styptic; he went so far as to say that, being easily obtainable, it ought to be kept by every family in case of accidents. As 80,000 copies of this work were sold in Great Britain during the author's lifetime and it was translated into all the principal European languages,³ it is not unlikely that his recommendation helped much to make agaric a popular remedy for bleeding with our forefathers. No work of the kind had been published before in this country. Cobbett⁴ thought it tended to make its readers hypochondriacal, and in his *Advice to Young Men* he wrote: "Read the *Domestic Medicine*, and by the time that you have done you will imagine that you have all the diseases of which it treats." But the fungus prepared as described was useful for domestic purposes in another way. After being boiled in nitre, it made good tinder when fires were lighted with flint and steel, and, being extensively manufactured on the Continent, was termed "amadon" and "German tinder." Of late years agaric has received little notice in surgical works as a dressing for large bleeding wounds, but there is mention occasionally of amadon as a plaster for stopping bleeding from small blood vessels.

A fungus that has had a far more lasting reputation as a styptic is the giant puff ball, *Lycoperdon giganteum*, formerly known as *Crepitus lupi*, which it is said the Greeks called *κράνιον*, on account of its resemblance, when full grown, to a human skull. It is of a globular shape, and commonly found growing in pastures during the autumn. At an early stage of its growth the outer covering, or peridium, is like white kid, and the pulp inside, or capillitium, firm and fleshy, but afterwards dry, spongy, and powdery. The powder, which consists of spores, among which are many fine filaments, has been used by the peasantry for centuries to stop haemorrhages. Recently an old countrywoman in Kent said she remembered when she was a girl and bled from the nose her mother would take her to an orchard, and, making her lie down on the grass, gather a puff-ball and apply the powder to her nose with good effect. As regards the use of the giant puff-ball in surgery, there is good evidence that it has been applied frequently to stop bleeding with

excellent results. In 1560 it was recommended as a styptic by F. Wurtz, a German surgeon. Afterwards, in 1706, Helvetius wrote in a letter⁵ concerning the fungus:

But of all haemostatics, *Crepitus lupi*, commonly called "vesse-de-loup," a fungus of the family of *Lycoperdons* is the best, which stops bleeding in a surprising manner, without causing either pain or an eschar as vitriols do. The largest and most powdery of the *Lycoperdons* should be chosen; it is cut in slices and applied to the arteries or open veins. To remove these they are bathed with a little warm water, for it forms a kind of glue when mixed with the blood that is very adhesive.

This was written after seeing an operation for cancer during which the fungus was applied as a dressing. Adrien Helvetius⁶ was born in Holland in 1661, his father being physician to the Prince of Orange. He went to Paris to vend certain drugs, and was so successful in treating many cases of dysentery with ipecacuanha, then a drug almost unknown, that he was awarded a handsome sum by the French Government for revealing the secret of his cures. Among his patients was the Duchess of Chaulnes, and this led to his being recommended by Colbert to the Dauphin. Thus he gained much renown as a physician.

The next observation on the styptic properties of the fungus seems to be a memoir presented to the Royal Academy of Sciences at Paris by Le Fosse, who was farrier to the King of France. In this he asserts, according to a translation which appeared in the *Gentleman's Magazine* in 1755:

1stly. That by applying the powder or dust of the *lycoperdon* or bulfist, to very considerable divided arteries in horses, the blood was stopped in a few minutes and the arteries cicatrized by this means alone without any succeeding haemorrhage.

2dly. That about 24 hours after the application of this remedy, a membrane or rather a pellicule was observed to cover the extremity of the divided artery with a small grume, which perfectly closed the orifice.

3dly. That the pulsation of the artery was very distinctly perceived there.

4thly. That the grume was conically shaped, the base closing the orifice, and the point turning inward.

Special commissioners having been appointed by the Academy to determine the truth of these statements, Le Fosse applied the powder of the fungus to several large arteries which had been divided in a mare.

"The blood spurted," the Commissioner's report states, "with great force from four arteries; he applied the *lycoperdon* powder to the stump, with only a cap of hog's bladder, and took off his dressing in a quarter of an hour, when three of the arteries were staunched, but the fourth bled fast; however, by applying a pinch of the powder to the bleeding artery, which he kept to it only with his finger, that also was staunched in six minutes." More of such evidence being given the report ends: "From what has been laid down it may be concluded that M. le Fosse has advanced nothing but the truth; however, we agree that the use of this powder for stopping of blood was not wholly unknown; but it is not certain that the blood of the most considerable divided arteries was ever attempted to be stopped by this remedy before." (Signed) Bernardde, Jussieu, and Bouvart.⁷

Within the last fifty years some practitioners in Ireland have pointed out the value of puff-ball as an application for controlling violent and constant haemorrhages. Sir William Whitla,⁸ for example, remarks concerning this fungus:

The writer has seen it used in formidable haemorrhages, dusted over the bleeding surface, and plugged into deep and tortuous wounds where the open vessels could not be reached with a ligature, and the rapid and effective manner in which it arrested bleeding was most surprising. He has seen it immediately arrest copious haemorrhages which he believes could not have been controlled by any other haemostatic. How it acts is unknown.

The writer, in bleeding haemorrhoids or fissures, has had great satisfaction with the remedy which he uses plugged into large hollow suppositories and inserted into the rectum. He has been able to satisfy himself that he has saved life in this way, in a case in which the shock of an operation would have been fatal. He finds it to be an excellent remedy for epistaxis, and he plugs the nostrils with the fungus, leaving it *in situ* for several days, and always finds it act most satisfactorily in stopping the bleeding.

A poor woman in Ireland who had suffered from an open cancer of the breast for a long period, and had tried almost every form of dressing without allaying her sufferings or the constant haemorrhages, eventually sought the aid of a

country quack, who suggested the application of a puff-ball. The surgeon who attended her states:

From the day the patient commenced the use of this substance her sufferings were greatly mitigated, and she improved in health and strength. The frequent bleedings ceased, and the foul odour from the sore was greatly diminished; indeed, so admirably did the puff-ball act, that the poor woman lived in comparative comfort for seventeen years after the first appearance of the cancerous ulceration.

"Mr. Fagan of Belfast," he mentions, in giving further evidence of the value of puff-ball, told him "that when removing a large tumour from the neighbourhood of the orbit, he encountered the most violent haemorrhage from large arteries in the bone, which of course he could not tie, and which even pegging with pieces of wool failed to control, yet a small piece of puff-ball at once restrained all bleeding."⁹

In a case of alarming haemorrhage after miscarriage Dr. Duncan¹⁰ of Tyrone introduced half of a puff-ball into the vagina and arrested the bleeding, when ergot and plugging the vagina in another way had failed.

Two cases of profuse bleeding from the nose were treated successfully in America with pieces of puff-ball inserted as plugs in the nostrils by Dr. Hall,¹¹ who wrote:

As a haemostatic for controlling the severer forms of epistaxis, I believe it has no equal. I have such confidence in it for this purpose that I am now never without it. I believe that no valid objections can be raised against its use on the ground that it is not sufficiently aseptic, while, on the contrary, it is to be preferred to many haemostatics on account of its non-irritating qualities.

If we compare these observations with those made before in the eighteenth century we find them much alike in their favourable estimate of the fungus as a styptic. I have seen troublesome bleeding after the extraction of a tooth readily stopped by a bit of puff-ball thrust into the empty socket when other styptics had been applied with no good result. If the plug is swallowed accidentally it can do no harm, as the fungus is quite innocuous when eaten. Heating the puff-ball in an oven to render the dressing aseptic does not appear to impair its haemostatic properties. One objection may be raised to its application to wounds of the face—that an ugly brownish stain is often left, but this usually soon disappears.

In times when more often than not excessive haemorrhage was checked with burning irons, boiling oil and tar, and powerful escharotics, the application in their place of soft non-irritating fungi must have been greatly appreciated by patients who were wont to suffer much under the hands of surgeons.

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AFTER-HISTORY OF GASTRO-ENTEROSTOMY FOR PEPTIC ULCER.

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THE present paper is a study of the after-history of 67 cases upon which the operation of gastro-enterostomy had been performed for ulcer of the stomach or duodenum. The operations have been done by many different surgeons, and for almost every clinical type of ulcer. They were performed at St. Mary's Hospital during a period beginning in 1904 and ending in April, 1910. In the most recent cases there was an interval of at least eighteen months between the operations and the inquiry as to the present condition of the patients, while in the older cases more than five years had elapsed.

The results here reported have been based upon the patient's freedom or otherwise from those symptoms which troubled him before the operation, or which still indicate active ulceration. Thus, when a patient, having been operated upon, reports himself entirely free from pain, sickness, and vomiting of blood, while he can enjoy

ordinary food, and has perhaps gained in weight, his result is marked as "excellent" (E).

Supposing, however, that a patient states that he is little better, and that his pain, vomiting, etc., have not improved or that the improvement be only very slight, his result is recorded as "bad" (B).

It is remarkable that the great majority of all cases are easily classified into one or other of the above categories. If any improvement has taken place, it is in most cases complete. There have, however, been some in which the recovery has been only partial, and these are classified respectively as "good" and "fair" (G), (F).

Where results are recorded as excellent there is no possible doubt that this is a true description of the case, for, as a rule, the patients themselves are most enthusiastic when referring to their condition. Similarly, there has been no hesitation in stamping any case as failure when the patient is still troubled with symptoms; for, even though pain, vomiting, etc., may have been slightly reduced, if the patient is still conscious of disease in the stomach or duodenum he has not been cured by the operation.

THE MORTALITY OF THE OPERATION.

Out of 92 cases there were 7 deaths immediately following the operation (7.6 per cent.). All these deaths occurred amongst the first 39 cases; throughout the last 53 cases there was no death.

The causes of death were as follows:

- 1 general peritonitis due to perforation of the ulcer just after the operation.
- 1 general peritonitis from leakage of the anastomosis.
- 1 septic bronchopneumonia.
- 2 collapse.
- 2 causes unknown.

The death of the first case was almost unavoidable; it could, perhaps, have been prevented by invaginating the ulcer at the time of the operation, but, as the liability of the ulcer to perforate can scarcely be ascertained during the operation, invagination is rarely performed. This case was an unfortunate accident. The second case—due to leakage—was the result of faulty technique. This was one of the earliest cases of the series. Where the ordinary method of suture is employed leakage at the site of anastomosis is very rare. In one case, in 1904, Murphy's button was used; the patient died soon after the operation, from melaena. The third patient died from bronchopneumonia, quite independently of the special nature of the operation. This patient would probably have died whatever operation had been performed.

Two patients died of collapse during the first week. The collapse may have been due to the gravity and duration of a serious operation performed upon a patient probably exhausted by a succession of haemorrhages, and a long period of semi-starvation from continued vomiting. Another cause of the collapse may have been haematemeses or melaena following operation. This is not an infrequent cause of death. In neither of these cases, probably, did the operation contribute to the speedy death of the patient, for in the first instance—death due to collapse from exhaustion and low vitality—the patient would have died if not operated upon; and in the second—death from haemorrhage—the operation probably had no part in starting the bleeding.

Thus of the 5 cases of death the causes of which are known, 2 died owing to unfortunate accidents, 2 died in spite of the operation, and in 1 only was death due directly to the operation—the case in which the anastomosis leaked. So much has the technique improved during the last few years that this cause has been practically eliminated.

AFTER-HISTORY OF 68 PATIENTS.

Of the 92 cases of the series 68 have been traced; of these 3 have died in the interval (4.4 per cent.). Probably others of the 92 cases not traced have died, and this would account for the failure to trace them. From the accounts furnished by their friends, it appears that 1 died of perforation, 1 from "a recurrence of the malady" (? haematemeses), and 1 from a cause unknown. Thus the total mortality of the operation, plus that of the uncured ulcer after operation, is 10.9 per cent. These figures should be compared with the mortality of the disease when treated