the insertion of a cannula open at the end could not fail to give rise? An artificial point appeared to be the only solution; and it seemed to me that cocoa-butter was possessed of a peculiar fitness for the purpose; for this reason; for a hard dense substance, its dissolubility under moderate heat is, I believe, quite without parallel. Subjection to a temperature of 96 degs. dissolves such a portion of it as my purpose requires with curious rapidity—in as nearly as possible one minute. There is besides the additional advantage that it serves as a lubricator in its passage to the bladder. But it is not in connection with my instrument alone that this application of it will, I hope, be found to be a profitable discovery, but in every operation where it is expedient temporarily to close the mouth of a catheter or cannula. I mean that I consider the cocoa-butter point *per se* worthy of attention.

I would now briefly suggest to you a further adaptation of the principle and form of the Extractor that may be found useful. As a self-retaining catheter (Fig 3), I cannot help thinking it would prove as simple and effective an appliance as could be used; and I know that the increased demand for these instruments of late has called forth various improvements and emendations in the means both of introduction and of retention.

After speaking so long of myself and my own labours, it is especially pleasant to me to turn from them to the more agreeable task of acknowledging, which I will do as briefly as possible, the obligations that I am under to those who have generously afforded me assistance, which has been invaluable to me in surmounting the difficulties with which I have had to contend.

Amongst my medical friends I must mention Mr. Barnard Holt, to whom I am indebted for sound practical advice. To Dr. Robert John Lee I owe more than I can express, for the unwearied patience and kindness with which he has assisted me in my experiments on the dead subject; also to Mr. Warrington Haward of St. George's Hospital, who deserves my warmest thanks not only for facilities and personal help afforded me in the *post mortem* room, but for the preparation now on the table, by which I hope to be able to exemplify practically the processes I have described.

The success that has attended the manufacture of the instruments is due in part to the care and attention bestowed on them by Mr. Charles Maw, of the firm of Maw and Son, Aldersgate Street; and in part to Mr. Jaques, the representative of the firm of Messrs. Warne and Co., Tottenham India-rubber Works, who, in the cause of science and suffering humanity, spared neither time nor trouble in bringing to perfection the India-rubber tube and convolvulus, devoting his best energies to the work in hand, with unflagging interest, until the end was accomplished.

The Calculus Detectors which I have brought with me this evening, were made by Mr. Hawksley of Blenheim Street, who has taken especial pains to carry out my instructions.

For assistance in procuring suitable chemical agents for the solutions I have alluded to, my best thanks are due to Mr. Gale, of the firm of Bell and Co., Oxford Street, and to Dr. Flite, of the British Museum.

It remains only to commend the inventions to your criticism, and, if they meet with approval, to your adoption. That they are faultless, it would be too much to hope. Time and use would doubtless suggest improvements, modifications, and additions; but if the principles be sound, a step will have been gained. It would have been more satisfactory for you, and certainly for me, had I been able to bring evidence of successful operations effected by their means; perhaps on a future occasion some of the gentlemen present may be able to supply this omission. Meantime, I am content to hand them over to the profession—for what they are worth.

NOTES ON CONSUMPTION.

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IV.—CONSUMPTION AND HÆMOPTYSIS.

SOME years ago, there was an interesting discussion at the Medical Society of London, respecting the significance of hæmoptysis; and I quite well remember the general impression at that time, that phthisis and hæmoptysis were so essentially related to each other as to justify the conclusion that they were but different terms for expressing the same condition. It was, in fact, simply but significantly put by one of the speakers, and received the general assent of the meeting, that "hæmoptysis meant phthisis." Those who, like myself, were in the habit of seeing a vast number of consumptive patients at a special chest-hospital, might very fairly have joined in such a conclusion, the two conditions being in such institutions constantly associated. A

further reflection upon this point, however, must make it sufficiently obvious, that the value of hæmoptysis, in a diagnostic point of view, cannot be exclusively studied in consumptive patients, but that the expectoration of blood must be taken as a separate condition or symptom which must be traced backwards to its cause or origin.

My own opinion may be thus briefly stated. I consider that phthisis must claim hæmoptysis as one of its most frequent and important symptoms; but that expectoration of blood is very often indeed quite unconnected with tubercular disease.

I propose, in the first place, to consider hæmoptysis in its non-tubercular relations.

1. Any cardiac obstruction, whether from excessive or diminished action of the heart, or from any defect in its valvular structures, may produce hæmoptysis, which may be either small or large in amount, and either pure or mixed with bronchial secretion. Perhaps the most common and severe cases of hæmoptysis from heart-disease occur in connection with mitral obstruction; but cardiac derangement of any kind, by disturbing the normal balance of the pulmonary circulation, is liable to be attended with this symptom. What was formerly known as "pulmonary apoplexy," and which is generally due to heart-obstruction, is often attended and relieved by the occurrence of hæmoptysis.

2. Hæmoptysis from the rupture of an aneurism of the general circulation is occasionally met with; but it is, of course, usually to a large and rapidly fatal amount; although the final rupture is sometimes preceded by small and occasional discharges of blood, arising either from local pressure or the congestion of surrounding parts.

3. Hæmoptysis is an occasional but far from common attendant upon intrathoracic malignant growths; but in such cases it is usually small in amount.

4. Simple bronchitis, whether acute or chronic, sometimes, but not often, gives rise to hæmoptysis. I remember two such cases in which the loss of blood was extreme, and in one of them nearly fatal; but the more common form of bronchial hæmoptysis is of moderate quantity, and is evidenced rather by tinged or streaky sputa than by pure or abundant blood.

5. Bronchial congestion, or that state of lung short of actual pneumonia, is often attended, and indeed relieved by, more or less hæmoptysis. Such condition is frequently to be met with in low febrile states, in which the pulmonary organs have become implicated.

6. True pneumonia, as is well known, is a constant occasion of hæmoptysis; but in this disease the blood is seldom pure, but intermixed with pulmonary secretion in the well known form of "rust-coloured" expectoration. Pneumonia, which has passed into a chronic form, is also often attended with hæmoptysis.

7. Hæmoptysis is occasionally met with in connexion with an impoverished or thinned condition of the blood, the bleeding not being limited to the pulmonary or bronchial membranes, but proceeding also from the throat or gums or other parts. In one such case which fell under my notice, there was likewise a sanguineous exudation from several parts of the body, and even from the extremities of the fingers. In this form of bleeding, which has sometimes been called *spurious hæmoptysis*, but which is nevertheless a reasonable source of alarm, and may occasion doubtfulness even to the medical mind, the blood is never pure, but of a thin watery character, much resembling, as I have elsewhere described it (On Hæmotysis, *Lancet*, vol. 2, 1865), a mixture of red currant jelly and water.

8. Not infrequently a congested state of the pharyngeal mucous membrane or of the tonsils is attended with an escape of blood, either pure or mixed with mucus from the surrounding parts. I have frequently seen this occasion great anxiety, as it is often associated with a defective state of the general health, which may easily be construed into consumptive symptoms.

9. Many writers have treated of a form of hæmoptysis which they have styled "vicarious," as being either supplementary to, or taking the place of other discharges, but especially the catamenia. I do not deny the possible existence of such cases, but I confess that I have never met with what have been to me satisfactory instances of the kind. Hæmoptysis must, of course, sometimes be coincident with the catamenial or other discharges of blood; but I have never met with an unequivocal instance of the one superseding, or being interchangeable with, the other.

From these few observations, briefly but perhaps sufficiently put, it will, I think, be apparent that in practice, we must meet with many cases of blood expectoration, which are quite unconnected with consumption, and that the idea once prevalent, and which I think to some extent still remains, that hæmoptysis is practically but another name for phthisis, must be erroneous.

I have next to consider hæmoptysis in its bearing upon phthisis.

[To be continued.]