each kidney separately; and before performing nephrectomy it would be well to do this. In the male the procedure is so difficult that I doubt if, even in the most expert hands, complete reliance may be placed on the result. Other ways in which the condition of the other kidney may be ascertained have been adopted. For example, some surgeons advocate that before performing nephrectomy an incision should be made into the abdomen in the middle line in front, and both kidneys examined by palpation. This is, however, a very uncertain method.

On the one hand, no doubt, if one finds that a kidney is nodular and knobby, with all the other symptoms of tuberculous kidney, one may safely say that it is tuberculous, but it does not always follow that because a kidney is smooth and of normal size that it is not tuberculous. Again, where one finds that a kidney is distinctly enlarged one is apt to look on that along with the other signs of tuberculosis as an indication that that is the affected kidney; but it has happened more than once that the kidney on the side where tuberculosis was suspected has been small or normal in size, while that on the other side was markedly enlarged, and subsequent examination has shown that the small one was the tuberculous one, while the large one was simply a healthy one undergoing compensatory hypertrophy. Hence palpation through the abdomen is in reality of very little use, and only adds to the complications and risks of the operation. More important than palpation through the abdomen is the proposal to cut down on each kidney; in the first place, to cut down on the kidney which is supposed to be diseased, and to ascertain without opening the kidney whether the conditions are such as to render nephrectomy advisable; if this is the case to temporarily stitch up the wound, turn the patient over on the other side, and expose the other kidney, which should then be turned out, and, if necessary, incised with the view of making sure as to its healthy condition. The objections to this procedure are that it of course means extra shock, which cannot always be borne by a patient with tuberculosis of the kidney; and further, even with incision into the kidney one cannot be quite sure that there may not be early tuberculosis at some part. Nevertheless this procedure is the one which it is probably best to adopt if by no other method of examination one can come to any definite conclusion as to the healthy condition of the second kidney. In some cases, however, the matter must be left to chance; and where the patient is suffering very severely, and one kidney is hopelessly disorganised, one must allow him to take his chance as regard the condition of the other kidney, for if the one kidney is hopelessly destroyed, one must assume that he has been living with the other kidney, and that unless there is any reflex suppression of urine as the result of the operation, he can still go on living with the other kidney after the removal of the first, and with a better chance of recovery when the debilitating disease on the one side has been removed.

The chief indications for nephrectomy are the unilateral character of the lesion, the absence of lesions in other organs, definite symptoms of tuberculosis, and sometimes the occurrence of severe hæmaturia. The contraindications are where the general state of the patient is very grave, where there is tuberculosis of the second kidney, or where there is tuberculosis elsewhere. There is no doubt that of all the procedures adopted for tuberculous kidney nephrectomy gives the best results. At the same time one may occasionally have a disastrous result where there is disease on the other side. Nephrectomy also may be performed either as a primary operation or secondarily to nephrotomy. The operation is no doubt most simple and most likely to be beneficial where it is a primary operation, but in some cases, as has been before remarked, the condition of the patient is so bad in the first instance that nephrotomy is all that can be done, and then when the patient's condition has improved the question of nephrectomy has to be considered. In these cases, where the kidney is removed secondarily, one generally finds that the adhesions have very much increased in number, so much so that the operation is prolonged, accompanied with considerable loss of blood and much shock, and there is also a risk of damaging the vessels which have been displaced by the contraction of the fibrous tissue. In some cases, indeed, the best plan is to remove the kidney piecemeal rather than to attempt to

take it out as a whole, but where it can be removed as a whole it should be done. Under such circumstances the capsule is separated till the hilum is reached; a pair of forceps are then applied over the hilum, and the kidney broken up and removed in pieces; finally, the hilum is examined carefully and the vessels tied.

In all cases in which the kidney is removed one must remove more or less of the ureter, and if necessary the whole of the ureter should be removed, and this can be readily done by an incision running downwards in the lines of the operation for tying the common iliac artery. As regards the operative procedures, where there is no perirenal abscess, and not much adhesion of the kidney, the oblique lumbar incision is perhaps the best; but in advanced cases especially after a previous nephrotomy, I prefer Terrier's method.

Of late good results have been obtained in some cases by a partial nephrectomy, especially in the early stage, the diseased portions of the kidney being removed, and the rest left behind. Several cases of this kind are chronicled in Mr. Henry Morris's lectures on *Diseases of the Kidneys*. The portions involved in the disease are scraped and clipped away, and the remainder of the kidney is tightly stitched up. In a considerable number of cases, however, the removal of the rest of the kidney has subsequently been necessary. This partial operation may also be combined with nephrotomy in cases where, on cutting down on the kidney, nephrotomy is found to be the desirable operation. Any bosses on the surface should be cut into and all the material scraped out, and if the kidney is fairly loose and can be taken out of the wound, one can pretty thoroughly clear out the tuberculous material. These cavities should then be packed, a drainage tube introduced into the pelvis and the wound closed. Some indeed stitch up the kidney after such operations without any drainage, but the other is probably the better procedure.

As a matter of fact, owing to the uncertainty as to the exact state of matters, when one cuts down on a tuberculous kidney, one must do so with an open mind, prepared to do one of the various operations which we have referred to; either to remove the whole kidney, to remove portions of it, or to be content with a nephrotomy combined or not with scraping. But on the whole, where the other kidney is healthy, the best results are obtained by nephrectomy.

LECTURES

ON

PHARMACY AND THE BRITISH PHARMACOPŒIA.

*Delivered before the Society of Apothecaries of London,
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LECTURE III.

THE PHARMACOPŒIA IN ITS RELATION TO PHARMACISTS.

Influence on Prescribing and Dispensing.

MASTER, WARDENS, AND GENTLEMEN.—If I had some hesitation about my first two lectures on the subject of the *Pharmacopœia*, I have more about this, in which I have to deal with much that relates to practical work. In the construction of the *Pharmacopœia* it was all very well to have in our minds ideals of what would be desired by students and medical men, but our labour has been in vain if we have produced a useless, an unworkable *Pharmacopœia*. In this last lecture, in which I propose to deal with the part important to those engaged in the preparation of pharmacopœial substances, data are wanting to show whether, on the whole, we have succeeded or failed. In the first place, of course, we have to look to the influence of the *Pharmacopœia* on prescribing and on dispensing; to inquire whether it facilitates either or both.

For this purpose we must consider the alterations introduced into the *Pharmacopœia*. Now alterations in the volumes are to be found on every page, in nearly every line, but for the purposes of this lecture, it is convenient to consider them in the way in which they are given in the prefatory pages, as alterations in

the names of preparations, alterations concerning strengths, and alterations concerning the composition of different galenical preparations. We have to inquire whether these alterations are, as a whole, calculated to assist or obstruct; whether, in fact, they are of much, of any assistance, or whether they are really to be looked upon as needless and unwarrantable by both pharmacists and prescribers.

Alterations in Nomenclature.

In the first place, with regard to alterations in the names, it is perfectly obvious that changes of name may affect the degree to which the *Pharmacopœia* is employed by the practitioner, and on the degree to which it is employed by the medical man depends, on the whole, the influence it will have upon the work of the pharmacist. Unless its drugs are prescribed and prescribed fairly frequently, very much of the work of the pharmacist will degenerate into mere barter of proprietary preparations. In the *Pharmacopœia* is a list, a page and a half long, of articles and preparations the names of which have been altered. I have gone through this list carefully because I thought it appeared rather long, and this list I found could be cut down for practical purposes to only ten names. I may as well read those only which I consider essential. A good many changes consist of minor alterations in spelling where a letter has been substituted for a diphthong, as *e* for *æ*. This change of spelling is of no matter; so long as the patient gets his drug, the change of orthography is scarcely worthy of mention. It may be important from a pedantic point of view, but it will have no influence on the practical use of the *Pharmacopœia*. *Argenti et potassii nitras* in the *British Pharmacopœia* 1885 becomes *argenti nitras mitigatus* in the *British Pharmacopœia* of 1898. This is merely a more correct way of indicating that in this preparation the activity of silver nitrate is reduced, and that potassium nitrate is added as a diluent.

The next is perhaps more important. *Ergotinum* has now become *extractum ergotæ*, and this is of the greater importance owing to the change of *injectio ergotini hypodermica* to *injectio ergotæ hypodermica*. It seemed rather absurd to retain a special name for a substance that could only be defined as a purified extract, for which no definite composition could be given. The name *ergotin* appeared to suggest that the substance was an active principle, instead of being a mixture. Is there any inconvenience in this change of name? I think not, because most medical men in obstetric practice carry the drug with them, or if, being pressed for time, the case being urgent, they write to a chemist for it, they will use abbreviations, thus: *Inj. ergot. hypoderm.* Whether the doctor is thinking of *ergotin* or of the extract of *ergot* is a matter of no importance; the chemist knows thoroughly well what is wanted.

Then with regard to *lini farina* and *lini semina*, which are changed to *linum contusum* and *linum*, practitioners rarely use any of these names; they employ the English equivalents. The *linimentum iodi* is now altered to *liquor iodi fortis*; probably nobody, not even the most energetic of medical students in his first year, uses the *linimentum iodi* as a liniment; the preparation is a strong solution of iodine which is painted on, and not employed with friction; hence the name *liniment* was misleading.

Then with regard to *liquor plumbi subacetatis*, to which *fortis* has been added, this is really an academical distinction, and merely emphasises that the *British Pharmacopœia* has a strong and a weak solution. The next, *pilula asafetidæ composita*, is now changed to *pilula galbani composita*, and this change has been effected partly because many older practitioners have been in the habit of employing the latter name, partly because "*asafetida*" suggests unpleasant ideas, and partly because *galbanum* is present.

To employ the term *cascara sagrada* in place of *rhamnus purshiani cortex* is, I think, an improvement inasmuch as *cascara sagrada* is the name applied to the official preparations, and there is no advantage in laying undue stress upon the botanical source.

The change from *tabellæ nitroglycerini* to *tabellæ trinitrini* was made with some hesitation. It must be remembered that the *Pharmacopœia* is indebted to Mr. Martindale for the formula by which the *tabellæ* were compounded. It was felt desirable to alter the proportion of the ingredients, to give

more chocolate in each tablet. It was found in practice that patients suffering from angina pectoris are often in the habit of breaking the tablets, and of taking a half or a third of the pharmacopœial dose; it was thought this division could be more readily effected with larger tablets. Since the original proportions were altered it was obviously desirable to change the official name, and the recent introduction of the solution of trinitrin suggested an easy way out of the difficulty.

Now, apart from these alterations of name, I think it will be found that the remaining changes are of very small moment—that they consist, for instance, in strivings after accuracy, in the substitution of the term "*hydrochloride*" for what used to be "*hydrochlorate*"; the addition of a suffix, as in *aloinum* and *pepsinum*; in some instances the omission of a word or of a single letter, as the *ferri arsenias*, which becomes *ferri arsenas*. These changes are not likely to interfere with the use of any of these preparations by the prescriber.

Alterations in Strength.

It will be found that the Committee of Revision have been careful to alter the strengths in accordance with the other alterations introduced. The primary idea, as I have already indicated in the first two lectures, was to facilitate the use of the *Pharmacopœia* by the student and prescriber by altering and simplifying the doses. To carry this idea into effect changes in strength were necessary. I will not weary you by going over the whole list of drugs of which the strength has been altered; but to take infusions as an example, it will be found that the infusions of *chirata*, of *ergot*, of *rhubarb*, and of *serpentry* are now made of double their former strength. The dose of these infusions has been reduced, so that it is now "*half to one ounce*" instead of from "*one to two ounces*."

The spirits of *cajuput*, *cinnamon*, *juniper*, *lavender*, *nutmeg*, *peppermint*, and *rosemary* are now directed to be made of five times their former strength. Here again the dose has been reduced; to obtain uniformity a convenient dose had to be fixed. The spirit of *chloroform* is so commonly employed that any change of its dose would give endless trouble. We tried, therefore, to harmonise the doses that did not matter very much with those that did matter a great deal. Doses of half to one drachm are now reduced to five to twenty minims, and accordingly the strength must be correspondingly increased. With some preparations this explanation is not entirely true; it does not give the whole reason of the change. For instance, *aqua chloroformi* is now made half its former strength. The strength was previously determined by the degree of solubility of *chloroform* at the ordinary temperature; hence the amount of *chloroform* that dissolved would obviously vary with conditions outside the control of the pharmacists. Some patients complained greatly of the burning taste of *aqua chloroformi* when it was used merely as a solvent, while others complained of unpleasant eructations or after-taste. All these objections are to a great extent met by the present alteration.

The strength of some of the extracts—for example, the alcoholic extract of *belladonna* and the extract of *nux vomica*—has been changed very materially. The alcoholic extract of *belladonna* is now one-third its former strength, the extract of *nux vomica* is two-thirds its former strength. Both these are standardised preparations, and the first is now brought to be a 1 per cent. preparation, the second is a 5 per cent. preparation. It was thought advisable to make these changes in order to obtain something that would favour the future use of the decimal system. It must be remembered that in producing this *Pharmacopœia* we were looking forward to the time when prescriptions should be written on the decimal system, when we shall be in harmony with the practice abroad, and when our practitioners shall find no difficulty in a foreign country in prescribing in accordance with a foreign *Pharmacopœia*.

The hypodermic injections of *apomorphine* and *morphine* have been reduced to half their former strength, and the change has been made to facilitate their employment. The Committee were informed that these solutions are rarely employed at the present time, that practitioners are much more in the habit of using little compressed tablets. These can be dissolved in an unmeasured quantity of water, which therefore contains the dose required regardless of the exact number of minims injected. If the hypodermic injections were to

retain a place in the *Pharmacopœia*, it was certainly desirable, from the point of view of safety, to increase the dose and degree of dilution.

[Dr. Tirard then referred at some length to the changes in liquor epispasticus, in the phosphorus pill, in the compound soap pill, and in many of the tinctures.]

The alterations of strengths of the tinctures were influenced by the desire to render the doses more uniform. The most important alteration, of course, is the change in the tincture of strophanthus, the strength of which is one-half of that formerly ordered, while the dose is made the same as that of digitalis. Another important change, the results of which require to be watched carefully, is that in the compound tincture of chloroform and morphine. It has been represented that this is a very serious matter, since we are now using four times the previous quantity of morphine hydrochloride. I am not quite sure that this is distinctly dangerous. An ordinary 10-minim dose only contains $\frac{1}{4}$ gr. of morphine hydrochloride. I have so often been told by practitioners that they use neither the official preparation nor chlorodyne, that I have made very many inquiries as to what becomes of all the chlorodyne that is manufactured, and, I think, I have at last run it to earth at sea. In the revision of the medical scale of passenger ships it was found that chlorodyne was considered an important drug; it was used not so much by the medical men on passenger ships or in the mercantile service, as by the captains, who are said to be in the habit of using chlorodyne rather lavishly on emergencies.

Since chlorodyne has been employed somewhat recklessly—poured out in a spoon or a cup—and since it is distinctly dangerous to allow a drug containing morphine to be used in this way, the pharmacopœial preparation has been introduced, and an attempt has been made to safeguard its employment by insisting on the use of a special poison bottle, with a red label to indicate poison, and with careful directions as to the mode of administration.

ALTERATIONS IN COMPOSITION.

I am afraid that, speaking in this Hall, I may lose some respect by saying that I really do not care very much about the alterations in composition. It is a matter of comparative indifference to me how pills are made up so long as they contain the active ingredients required by the prescriber. On looking at the list of preparations of which the composition has been changed, I find that the pill of aloes and iron, of aloes and myrrh, the compound asafetida pill, the compound calomel pill, the compound rhubarb pill, and many others, have been altered. This list is disquieting until it is realised that it only affects the excipient; it is merely a substitution of syrup of glucose for glycerine, treacle, or confection of roses.

With the hypodermic injections which find a place in the list, the alteration is merely the use of distilled water in place of camphor water. I do not think the dispenser or prescriber troubles much about that. It is a question for pharmacist whether the liniment of ammonia is to remain as before, or whether we are to employ almond oil instead of some of the olive oil; or whether in the liniment of soap we are to use soft soap instead of hard soap.

[Dr. Tirard then referred in detail to the alterations in the composition of various plasters, extracts, liquors, lotions, mixtures, powders, tinctures, and ointments, and he showed that the majority of the changes were desired by pharmacists, and were immaterial to medical men.]

Conclusions.

Towards the close of these lectures, we have to look back, and consider the results of all the changes that have been made in the *British Pharmacopœia*. How do they affect the chemist, the dispenser, the manufacturer? Are they dangerous? Do they furnish any directions that are impracticable? Are they merely troublesome worries, free from danger but devoid of advantage? I do not think there is much danger, except possibly with the compound tincture of chloroform and morphine, or with the tincture of nux vomica. The alterations of dose have been made by the same people who made the alterations of strength; and these have been made side by side, so that if the strength has been altered or modified, the dose has been modified, and *vice versa*. The result is the same so far as the activity of the drug is concerned, but

the drug is more readily employed since the dose is more easily remembered. Within this Hall I have no right to speak of what is practicable and what is impracticable. New processes, and new standards have been introduced, but I do not think that these processes and standards need lead to any permanent difficulty, since they result from advice given by various manufacturing chemists and others, daily engaged in working with pharmacopœial processes. I have reason to believe that in the preparation of standardised liquid extract of belladonna, some inconvenience has been experienced from the production of definite physiological results when the pharmacopœial instructions were implicitly followed. I am disposed to think that any such undesirable results must be met by some alteration in the apparatus, which shall tend to check the diffusion of the dust of belladonna in the atmosphere.

In a work like the *Pharmacopœia*, intended for daily use, every alteration must be troublesome. It is inevitable that it should be so. I have great sympathy with the chemist who, in criticising the *Pharmacopœia*, protested against the numerous changes; he had had to work with four different *Pharmacopœias* during his life, and with a certain number of *Additions to the Pharmacopœia*. I have had to teach with three *Pharmacopœias*, and I know that any changes for a time produce some uncertainty and inconvenience. On the whole, however, I believe that the changes that have been made in this last *Pharmacopœia* are in the direction of simplification, they are favourable to the increased use of pharmacopœial preparations, and this means increased employment of chemists by increased prescribing of pharmacopœial drugs. It also means the diminished use of proprietary preparations.

To turn next to the question: How has the *Pharmacopœia* been received by chemists, individually or collectively? An ingenious chemist lately defined it as "a manual of inartistic, injudicious, inconvenient, injurious, and incongruous innovations." This individual criticism happily has not been echoed by the many. To look at the matter more seriously, how has the *Pharmacopœia* been welcomed?

The *Pharmacopœias* of various dates have had different characteristic names assigned to them, such as a physician's, or a student's, or a teacher's *Pharmacopœia*. The present volume was called a "wholesale druggist's pharmacopœia" at a meeting of the Pharmaceutical Conference at Belfast, and it was even complained that another Irish grievance had arisen, that the Irish pharmacists had not been consulted, that the Irish had had no opportunity of expressing their views. As a matter of fact the *Pharmacopœia* Committee included two representatives from Ireland, Dr. Atthill and Professor Tichborne. It is true however that the Pharmaceutical Society of Great Britain rendered invaluable assistance at every stage of the work, and therefore the Pharmaceutical Society of Ireland may have had some grounds for feeling hurt.

Everybody who has looked into the volume is now ready to suggest improvements and changes, but the whole point comes to this: Would these improvements, these changes, be generally acceptable? To say that everybody can alter the *Pharmacopœia* is merely to indicate the widespread interest taken in it; but where so many are concerned there is obviously need of a central controlling body, a central committee, which shall be perfectly unbiassed, and the result of whose deliberations shall be to effect a compromise between contending views. The work of a committee, especially with a book like the *Pharmacopœia*, is to discount any tendency to render the volume either a druggist's, a student's, or a physician's *Pharmacopœia*. There is always the possibility that in the advice received one or other of these elements may predominate. The endeavour of the committee is to smooth away these differences and to produce a work which will not satisfy everybody, because that is proverbially impossible, but will be equally fair to all, and should thus satisfy the majority.

One word more as to why the compilation of the *Pharmacopœia* is in the hands of medical men. This you will remember forms a never-ending source of complaint in certain journals, although the duty of compilation is by Act of Parliament entrusted to the General Medical Council. The well-intentioned efforts of the *Pharmacopœia* Committee are continually being hampered by such remarks as this: "What is required is that every one competent to take part in the

work of revision should be allowed an opportunity of expressing his opinion before the book is published and before the official formulæ and processes are rendered unalterable for the time being." Just think, gentlemen, of trying to harmonise the opinions of everyone who thinks himself competent to give an opinion on the subject! And to quote further from the same article: "There appears to be a growing feeling amongst pharmacists that unless such recognition is forthcoming they ought to decline to have anything to do with future revisions of the *Pharmacopœia*, and if in addition they proceed to prove by deeds rather than words that they alone are competent to deal with a certain section of the work it may be that long before another new *Pharmacopœia* is called for pharmacy will have attained its proper position in the matter."

If we consider the way in which trade interests are affected by the *Pharmacopœia*, if we consider that the volume deals with things bought and sold, it is impossible not to realise the risks of trade competition, of trade influence, and the constant danger of introducing a standard which might create a monopoly. I would ask you whether, with this in view, it is not better that the compilation should be in the hands of those whose motives cannot be assailed, that the final responsibility should rest with those whose interests are not at stake?

THE ESSENTIAL TOXIC SYMPTOMS OF DIPHTHERIA.

By JOHN BIERNACKI, M.D.,

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IN the widest sense the total symptoms of an acute microbic disease may be regarded as the outcome of specific intoxication; but the directly toxic element in the complex morbid condition is generally masked by secondarily-induced phenomena. Among the latter there stands out the train of symptoms accompanying pyrexia—no doubt itself toxic in origin. In light of this consideration diphtheria appears to be a suitable disease for analysis since, in addition to the fact that data are available on the experimental side, there is at its acme a frequent absence of febrile symptoms.

It is obvious that fatal cases, in which the toxic symptoms are extreme, afford the best material for observation, care being taken to exclude a large proportion in which the issue has been wholly or in part determined by such adventitious factors as laryngeal obstruction, hæmorrhage, or pneumonia. Between the residual cases thus selected a notable resemblance will be found to exist. Briefly, for a time the only symptoms present are those ascribable to sore throat and fever, the first specific signs being undue pallor, moderate compressibility of the pulse, and lassitude. The significance of the latter signs is such that they frequently suggest the examination of the pharynx in children too young to complain of sore throat. There is little further change in the case until three or four days have passed. Then the pallor becomes increasingly intense and the pulse more compressible, but the pyrexia less. Later the pulse is irregular, the urine diminishes in quantity, and the extremities tend to become cold. Frequently there is oppressive pain referred to the cardiac region or epigastrium. Towards the end the surface of the body is blanched and cold, the temperature is subnormal, and the radial pulse disappears. Other symptoms are jactitation and dimness of vision. The patient's mind remains clear until the end.

Some years ago I was struck by the resemblance between the above symptoms and those which accompany fatal hæmorrhage in cases of enteric fever, the inference being that a common cause existed, namely, a fall in blood pressure. Dr. Brodie¹ has shown that an injection of diphtheria toxin produces in cats a rapid fall in blood pressure followed by a slower recovery. This depression Dr. Brodie traces to relaxation of the blood vessels. In fatal cases it is accompanied by a fall in temperature. As a result of hearing Dr. Brodie lecture on these researches it occurred to me that blood-pressure records obtained by means of a sphygmometer in cases of diphtheria might prove instructive. For this purpose I employed the pocket form of the Hill-Barnard instrument. In the result, successive observations in the same

case are accepted as accurate, although, owing to all the patients being children, certain considerations suggest a higher absolute pressure than that registered. Six cases ending in death, and twenty in recovery, have been studied. The results obtained in the former cases, which are at present alone under consideration, prove sufficiently consistent to permit the selection of a type, variations from which can be subsequently noted.

Morning and Evening Chart of Case.—In the uppermost transverse column is shown the duration of the disease in days. In similar columns below are given the urine in ounces, the pulse-rate, and the number of respirations. The thinner line in the body of the chart indicates the temperature in accordance with the Fahrenheit scale on the left, and the thicker one the blood pressure in mm. of mercury as shown by the figures on the right.

HISTORY OF A CASE.

K. M., aged 3 years, was admitted on the afternoon of the fourth day of an attack of diphtheria. She was a well-nourished child, with an excellent past history. Although somewhat pale she was bright and intelligent. The vital organs were healthy. Typical membrane (from which the medium bacillus was cultivated) covered both tonsils, and extended on the left side over a small part of the soft palate. The cervical lymphatic glands on the same side were slightly inflamed. There was no discharge from the nose. The patient's temperature was 100 F. The respirations numbered 26, and the pulse 124, the latter being slightly compressible. Half an ounce of chlorine solution internally was ordered every four hours, the pharynx being syringed at similar intervals with a saturated solution of boric acid. The diet consisted of 4 ounces of milk given two-hourly, with 1 drachm of whisky added. At 11.30 P.M. 15,000 units of antitoxin were injected. On the following day—the fifth of the attack—there was little change in the case beyond increased swelling of the neck, and the appearance of a very faint trace of albumen in the urine. It may be noted here that the albumen increased in subsequent specimens, until—in the last obtainable—the proportion was about 30 per cent. On the sixth day the general condition remained unchanged. Late in the evening a second dose of 21,000 units of antitoxin was given, as the membrane persisted and the cervical inflammation was increasing. On the seventh day it was reported that the patient had been sick during the night, when the pulse was weaker for a time. The whisky was now doubled, as it was difficult to give the patient her full quantity of milk. Fragments of membrane were washed away each time the pharynx was syringed. Towards evening the extremities were cold. On the ninth day much of the membrane had disappeared, the remainder being diffident. The pulse was more compressible. Sickness beginning in the night continued, and the patient was ordered whisky and water only by mouth, enemata of over-zymised milk being given. The difficulty in keeping the patient warm increased, and the skin was of a waxen hue. On the tenth day champagne replaced the whisky, and zymised meat suppositories the enemata. The pulse was slightly irregular. On the eleventh day the sickness was persistent, the urine almost suppressed, and the pulse progressively weaker and more irregular in force and rhythm. On the twelfth day the child had passed a very restless night, tossing about in her cot. The radial pulse was difficult to count. No urine was passed. On the thirteenth day the child was throwing herself about so that it was difficult to keep her covered. From time to time she gave the peculiar cry which, in the case of older patients, is accounted for by distressing cardiac pain. Although she was apathetic her mind remained unclouded. Finally the radial pulse disappeared, and death occurred shortly after midnight.

REMARKS.—The striking fall in the blood pressure will be followed on the chart. A point not mentioned, but also shown, is the fairly consistent fall in temperature. The slight rise on the fifth day is explained by an inflammatory reaction at the seat of the first injection of antitoxin. The progressive diminution in the urine is noteworthy, as it is seldom possible to measure the urine throughout the course of a fatal case.

In all six cases the fall in blood pressure was slight at the outset, but it suddenly became more marked, and was then maintained until the end. In the two most severe cases this