On Expectorants.
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by Henry Dodge.

The term expectorant literally signifies anything that causes the expulsion of matters from the chest, that is, from the respiratory tract. As we commonly use, however, it has a much wider significance than this. It is employed to denote those substances which in any way act upon the bronchial mucous membrane, either by directly or indirectly causing the secretion, or facilitating the discharge matter from the bronchial tubes, or by allaying irritation and diminishing cough. The term “astringent” used of the ancients corresponds exactly to the modern one of Expectorants. Under the general designation “astringent” the ancient physicians included not only Sanguis and other medicines which possess the property of directly influencing the expectoration, but also the various emollients (fragrances, <i>Liquorice</i>, &c.) and antiseptics (Opium, Arsen. Hyoscymum). All these medicines were employed by Galen as astringents, and they besides many others have been given in recent times as expectorants. The term expectorant...
therefore does not give a very precise idea of the nature of the remedies included under it, or of their mode of operation. Any change made, however, in the designation of this class of remedies would cause more confusion than any corresponding advantage that would arise from it. The following is the meaning that I shall attach to the term “expectorants” in these pages. Agents which promote expectoration, influence the amount or character of the bronchial secretion; or alter irritation in the respiratory tract.

This class of remedies is admitted by all authors on the subject to be very uncertain in its action, when these remedies belonging to the class which produce the property of directly influencing the quantity of the expectoration. Dr. Cullen admitted only two such medicines, viz. Squill and Tobacco. There can be no doubt, however, but that there is a group of similar properties, though none are capable of increasing the secretion to a very large extent; none are capable acting as general expectorants.

In the normal condition, the lining membranes of the air passages, the part orig. in which expectoration
* Cyclopaedia of Anatomy and Physiology
act, is moistened and lubricated if a small quantity of fluid is not unlike a thin solution of mucus. In the trachea and larger bronchial tubes, this is of the nature of mucus, but in the finer bronchi and in the air cells of the lungs it is probably a more exo-nasal, at least there is no evidence that mucous glands exist in these finer bronchi, and certainly they do not exist in the air cells, and according Todd the secretion of mucus is confined chiefly to the secretory channels of the glands. In the natural state of fresh air the secretion is merely sufficient to moisten the surface and protect it from the irritating action of the air. When in the normal quantity, as well as when slightly increased, the secretion is removed by the action of "cilia" which exist abundantly in the walls of the mucus membrane of the air passages. From the Larynx to the ultimate air vessels. In the smaller bronchi, however, the cilia are not so numerous, and are irregularly distributed and scattered over the surface, and the ultimate air cells they are entirely absent. These cells are in a constant state of vibration, and invariably fly upwards, so as to cause a current in that direction.
Dr. W. S. Gardner, in Medical Monthly Journal, 1861.
When the matters contained in the bronchi are in too large quantity to be removed by the ciliary motion, nature effects their expulsion in another way, after having reached a certain part of the air passages, viz., by the production of a rarefied and forcible blast of air, such as takes place in coughing or 'hawking'. Besides, the vibrations of the cilia, another power has been lately proved to cooperate in even to be the chief agent in, the expulsion of matters contained in the bronchial tubes. The muscular contraction of the bronchial tubes, that the pale fibres, situated in the walls of these tubes, to produce the power of contracting and diminishing their calibre, has been abundantly proved by the experiments of Volkmann, Williams, and others, and there seems to be no doubt that these fibres, by their successive and rhythmical contractions, aid in the expulsion of matters which have accumulated in the bronchi. This is certainly the case in pathological, and probably also in healthy, states of the tubes. It also appears to be established by the experiments of Volkmann, that stimuli applied to the Vagus nerve, excite the muscular fibres of the bronchial...
cause them to contract. This, as will be afterwards seen, will serve to explain, to a certain extent, the mode in which expectoration operates in causing or increased expectoration. In the act of coughing (by which expectoration is usually effected), a full inspiration is first taken; the Ears are then closed, to prevent the escape of any air; next the abdominal muscles and Diaphragm begin to contract and press upon the Lungs with their contained air; the Lungs is then suddenly burst (or driven) open, and a forcible explosive blast of air is produced, which carries out along with it any foreign matter that exists in the tubes. Cough is a reflex act, and, like others of the same kind, is adapted to produce a desirable end, in the present instance it is the expulsion of matters from the air passages, which have either obtained entrance from without or have accumulated in too large quantity within the air tubes, and which, if not removed by some such means, would grow in quantity until they caused Asphyxia and death. The presence of any foreign matter in the air passages excites irritation there, and causes an inspiration to be conveyed along the excitor fibers.
the Thymo-juicis to the Viscera oblongata, whence an influence is conveyed onwards along the motor nerves supplying the muscles of respiration... the abdominal and muscular... to excite them to act upon pressure... Cough however may exist independently of expectoration or any disease of the bronchi.

Enzymes or enzymes from irritation in other organs... the stomach... in which case it is said to be a sympathtic cough.

Expectorants act in different, and even opposite manners... They may be divided in the first place into General and local... that is those which act through the medium of the system and circulate and those which are brought into immediate contact with the parts to be acted on... Topical expectorants.

1. Topical expectorants. These may be subdivided into 1st Those which act only on the larynx and pharynx, and which are in the fluid form... and 2nd Those which act on the whole extent of the mucous membranes of the air passages. These are in the form of gas or vapour... either they exist naturally as gases...
Typical expectorants acting on the surface of the respiratory tract. This includes all those remedies (derived from the vegetable kingdom) which possess irritant and demulcent properties, of which the principal are the roots of Glycyrrhiza glabra, and Althea officinalis; the plants Cinnamomum verum, Pilocarpus, and Eupatorium; and the mucilage derived from Gum acacia, and Tugacanth, as well as the various turpentine gums, balsam, and tolu. These act mechanically by lubricating and protecting the cilia (with the gueiflament) and inflamed surfaces with which they come in contact, in the upper part of the respiratory tract. They have also a relaxing effect on these parts, and it is stated by Dr. Secrèt that they probably affect the bronchial membrane and Pulmonary structure by reflex action. Air acts as a powerful irritant to the inflamed mucous membrane when unprotected by its natural mucous secretion, and this secretion is always deficient, or absent altogether, at the commencement of inflammatory action in the part. These substances can not have any effect on that, much more often...
pulmonary the respiratory tract situated be-
low the chest. Except in the way men named by
Dr. Ferrini of reflex action. The air however if
the time it reaches the Larynx will have lost some-
what of its irritating properties. If becoming cold
in temperature; for it is kept stimulating in pro-
portion as it approaches the temperature of the body.

The other topical expectorants are also
the forms of gas or vapour and are brought into contact
with the bronchial mucous membrane by inhalation
along with air. This is accomplished either by being
heated by them during various respirations, or by means
of an apparatus devised for the purpose. Some of
them (as above mentioned) are naturally gases; others,
as water and tar, are rendered gases of heat; a
third kind consists of the smoke derived from the con-
fusion of plants, as tobacco and stramonium.

A great many substances were formerly used as ex-
pectorants in the form of gas; as different parts of the
following plants:—Tobacco, Stramonium, Hyoscyamus,
Also Pitch, volatile oils, water, alcohol, ether, lan-
or acid, acetic acid, sulphurous acid, ammonia,
Carbonate of ammonia, chlorine and iodine. Most of these are now obsolete as expectorants, and all that need be considered here are: Water, Stramonium, Tobacco, Chloroform, Chlorine, and Arsenic.

1. **Aqua**. The ordinary water, when inhaled, acts typically on the mucous membranes of the Larynx and Trachea as an irritant and excitative. In cases of acute inflammation, when the mucous membrane is dry, it will, if its relaxing effect, tend to promote excretion, whilst at the same time it will, by concentration, upon it, moisten the mucus and influence cough and protect it from the harmful air.

2. **Stramonium**. The essence of this plant is occasionally inhaled in pulmonary affections, more frequently however in those of a spasmodic than an inflammatory character. Its action is that of an antispasmodic and sedative. Its use is almost confined to the spasmodic affections, in which it frequently relieves the patient. The first symptom of this relief being usually excessive respiration, from which it may be expected among expectorants; though the proper explanation of its mode of action, and the
one which is supported by experiments on the lower animals, is that it operates by relaxing spasm and allowing expectoration to take place.

3. *Nicotiana tabacum* was highly recommended by Dr. Cullen as an expectorant; it is one of the two drugs with which he believed to possess direct expectorant virtues. It is probably in a similar manner to *Acamptium*; but its effects are not so well marked.

4. *Chlophyllinum*. Of late this remedy has become by inhalation, in various pulmonary affections. It is said to act by opening the cough and rendering the expectoration lossy. This result, which is said invariably to have followed its use in Scandinavia, in some of the German hospitals, is probably owing more to the sedative and antiphlogistic action, than to any power directly promoting expectoration.

5. *Chloricum*. The immediate effect of the inhalation of chloride in a much diluted state, is to cause increased expectoration, but ultimately it causes in pathological conditions of the bronchi a diminution of the expectoration. It is said to modify the nature of the expectoration, rendering it less frothy, less acidic, and less irritable.
* Magnifico Formuleire.

+ Dr. A. F. Strawn in Cyclopedia of Practical Medicine. (article: Experiments)
ting, to give the force of the energy they receive, does not change the nature of their incite to them. It action appears to be confined to the muscular surface. Chlorine was at one time inhaled extensively in the disease phthisici, which disease was thought in some instances to have been caused by it. More recent trials however have shown that it performed no such power. The inhalations are nevertheless useful in some cases of chronic catarrhal affection.

1. The vapours of tar have been used in pneumonia of affection as an irritant and expectorant, it increases the secretion from the branchial membranes. Though at one time it enjoyed much celebrity, both in the form of smoke and also as tar water in the treatment of phthisis, it is now seldom used.

Smoke are generally looked to act mechanically in promoting expectation, and ought been to be considered here. They are said to act by constriction, compressing the lungs, and forcing out in this manner anything contained in the bronchial tubes. Whether however they can act perfectly in this way, as well become evident to any one of the mechanisms of mucus.
It is for a moment considered:—previous to the act of vomiting a deep inspiration is taken; the glottis then closed (to prevent any escape of air) and remains so until the vomiting is completed; the abdominal muscles contract and carry the stomach against the diaphragm, which, if the inspiration be immediately preceding, is strongly arched downwards; the stomach thus compressed between two unyielding surfaces, air charges its contents (the esophagus being open) into the trachea, and thence extraneously. In this explanation, the act of the stomach itself has been left out of view (though it does contract upon its contents during the act); hence it can obviously have nothing to do with the one- 
ch restriction of matters from the stomach. If this explanation of the act of vomiting is correct, and it is the one generally admitted, it is quite impossible that anything, even air, can escape from the bronchi during the act of vomiting, since the larynx remains closed from first to last, and whilst this is the case no air can escape from the lungs. can it be at all 
consistent with, or can they be said to be at all 
compressed. The manner in which elastic air is pro-
duced by compression will be considered hereafter.
II. General expectorants. The remedies belonging to this division are much more numerous and important than those already considered. For the most part their action is dependent upon absorption into the system. They may be subdivided into mucilaginous, stimulating, and sedative expectorants.

1. Mucilaginous Expectorants. Of these the principal are Speenwurzel, tartar emetic, and guaiac. There can be no doubt that a close sympathy exists between the stomach and the lungs, as may be readily understood from their both being supplied by branches of the same nerve, viz., the phrenic; and is further shown by the vomiting which frequently takes place at the close of a severe paroxysm cough. If sympathetic cough be excited if food or a liquid be fed to the stomach—e.g., water, milk—expectorant action is produced. Zimliche were considered to cause the expulsion of matter from the Branchi mechanically, but, though it is generally admitted that they do cause increased expectoration, I have endeavoured to show that this cannot be the way in which they act. The expectorant action of emetics may I think be satisfactory explained...
as occurring through the agency of several sympathetic reflexes. It has been pretty satisfactorily proved that irritation of the vagus nerve causes the branchi to contract, and that the contraction is instrumental in the expelling mucus or other accumulations existing within. There can be no doubt that irritation of those fibers of the vagus distributed to the stomach is set up by irritation induced into it, and it is probable that this irritation is communicated to the fibers distributed to the air-tubes to cause them to contract upon and expel their contents, so that expectoration will follow the administration of an irritant if there happen to be any accumulations in the branchi at the time. But, besides promoting the expectoration, matters already existing in the air passages, they cause an increased secretion to be forced out there, — in like manner as irritation of the nerves supplying glandular organs, causes greater activity of secretion in these glands. For example increased flow of saliva from irritation of the nerves supplying the hiary glands. Some of the exciting irritants however, as will be mentioned immediately, have been considered to perform a specific action in the lungs.
and tend to cause expectoration independently, gaining sympathy between these organs and the bronchi. Antimony subnitrate given in small peeling doses causes free secretion of phlegm from the lining membrane of the bronchi, and from increasing the vermiform contraction of the tubes promotes expectoration. From the great amount and appearance attending its action as an emetic, its use in this way to cause expectoration is limited to the commencement of acute pulmonary disease, which probably acts more beneficially as a tonic-stimulant than as an expectorant. In chronic cases attended with debility, its use is quite contraindicated. Although it acts more powerfully in larger doses, it is customary to use expectorant action when given in small doses, and hence it is administered in doses from 1/4 to 1/2 of a grain.

Specimen of is probably as highly esteemed as an expectorant as any other medicine. It acts best when given in concomitant with a saline dose, though it is in itself effective. It seems expectorant action in small doses.
not to so great an extent as that drug, considered as
purifying the circulation, when given in unexciting or
excessive doses; and in the presence of circumstances
application. The astringent properties of
Speci"amanda and tannin are certainly shown,
accompanying a severe reaction, as well as the medium
of the pneumogastric nerve, but to a direct and specific
action on the lungs. That they possess some such
action seems probable from the observations and experi-
ments of Magendie and Ogilvie, for it is known of them that
the lungs of animals killed with Escharina (the active
principle of Speci"amanda) and tanninemicetic present
cases of congestion and inflammation
Veil's pneumonia. The use of this plant has been
long used as an astringent in pulmonary affections. It
was used for this purpose by the Greek physicians. It acts
as an astringent both in large and small doses, in the former
it causes nausea and vomiting at the same time, in the
latter as the effect is produced except an inexcusable
dangerous reaction the patient (at least as now we attract its
action). When given in small doses it is generally considered
to act as a stimulating astringent, but this stimulant
action (supposing it to exist) does not prevent its employ-
ment in the acute forms of pulmonary disease. Syrup
undoubtedly possesses the physiological property of ini-
citing the secretion of the bronchi, unconnected with any
irritant action. As an expectorant it is one of the
least expensive and generally employed articles which have
any reputation in the treatment of chest affections. It is
very frequently - for the most part in fact - combined with
spirit which is believed to increase greatly its expect-
orant action.

The direct emetics. Saltpetre Dust and Saltpetre Oesper
have been recommended as useful expectorants in bronchitis
in which the bronchi are already loaded with mucous and
irritants, and they are said to unload these toxins in such
cases. Equally well as in some other pulmonary affection.
The latter drugs are, however, much preferable as they
induce the bronchi to be more thoroughly emptied. The direct emetics are very
effective if ever employed in the present day as expectorants.

2. Stimulating expectorants. The principal reme-
dies belonging to this division are the folid gums Aca
-fusic, Calaminum and Ammoniacum; the balsam y
Dear and John; Can Bazinga; Bangor visit; Bungo, the
infirm; Ceylon; Canada; and other esteemed
some of these remedies probably act more of their general
stimulating properties in the system at large, than any
special action on the bronchial mucous membrane.
Though most of them are generally considered to have, and
are doubt to help some local action on that membrane.

The act of coughing, of which expectoration is affected, is
a muscular act requiring a certain amount of strength for
its performance; these drugs are generally given in the ad-
vanced stages of cough and other bronchial affections.
When the strength has been much reduced either by the same
by a long continuance of the disease, and when therefore a
stimulus, such as the cough in fact, is most needed by the
system. At the same time they have a special action on the
lining membrane of the air passages, by which a more healthy
action is set up in it, and the nature gets secretion almost
in quality and texture more consistent. This approach
my more to a healthy state; for (as before mentioned) the
bronchial secretion during inflammation, from being at first
thin and acid, becomes gradually more thick and congealing
and diminished in amount until it is reduced to
Dr. A. Hudson, Perim aetatis 2000 cal. a.
The natural standard,

The potash from Calomel and Aconitum resemble each other in their respective physiological properties and action. Calomel is more extensively used as an expectorant than Aconitum. Besides acting as stimulants they possess antispasmodic properties, and may thus act by altering cough dependent on nervous irritation. These substances, especially Aconitum, can be detected in the breath after being swallowed, and they therefore probably exert a tone suppressant action on the respiratory tract and tend to alter the quality of the bronchial secretion.

Ammonium resembles the last two substances in its properties and applications. It is said to act by causing the energy of the respiratory muscles. It, as well as Calomel and Aconitum, contains a considerable quantity of gum in its composition, so as to form an emulsion with water, in which from these 3 substances are best given as expectorants. When given in this way they are exerted topically in the upper part of the respiratory passages. The power given directly influencing the respiration, to produce the potash gums is very small, and they are seldom used except to assist expectoration.
Opinion. From the known efficacy of this drug in the treatment of other mucous membranes, it might be expected to prove equally beneficial in the case of this mucous membrane. Reasoning in this manner poison became and in chronic catarrhal affections and in the advanced stages of its pulmonary; and it is alleged with welcome advantage. In the case of its action it enters the circulation, and thus comes in contact with the irritating surfaces of the bronchial tubes, in which it is supposed to act as an antiseptic and decongestant, setting up a new and different kind of action in them. It does not come generally into use as an expectorant.

The balsams of Tolu and Trux, as common with the other remedies classified under this head, possess stimulant properties to which alone they apparently have owed their reputation. For they are now scarcely ever used in the treatment of pulmonary affections. The balsams of Tolu is still used as an adjunct to other expectorants only from its agreeable odour.

 Gum Bengoa and Bengoa acid. Bengoa once at one time obtained use as a stimulating expectorant, but its reputation has much decreased of late years, and its guin was probably kept up by its agreeable taste and smell.
In virtue of its stimulant action it has been popularly
common with the other tonics belonging to this class.
The expectorant properties attributed to styrax in were hitherto
also to be perfected, as to be noted, its crystalline principle —
Bengic acid, in consequence of which this acid has been
introduced into the brews in Hopical and Hopical
compound, and such, often ammoniated, but it is now, like
the curcuma, little used.

Styrax. The root of the Polygala styrax has been highly
recommended and universally used as a stimulating expectorant
in the latter stages of bronchitis, etc. It is said to act by
stimulating the secreting the bronchial tubes, in common with
other secretions. By most writers in the subject it is held
in high esteem. Thus Dr. Dorothea says it is an exceedingly
valuable remedy in the latter stages of bronchitis, or fibrous
inflammation in the bronchi, and that it
appeared to re-establish a healthy condition of the secreting
organs. The author of an essay on bronchial phlegm,
its action, I think, however, that its expectorant powers
have been much overrated, and that it-supposed acts of
expectoration, and owing to the stimulant action. It action
of this very little phlegmographic action in the bronchial sys-
Lectures on the Principles and Teaching of Physics.
consequence of this I have to keep myself from taking

Phosphorus in large doses for stimulating and excite-

rant properties—similar to the above. Besides from-
tough the refractation, it increases the perspiration of the body
relieves asthma, and improves the digestive functions (Dr.
C. Arden) it is only of use in domestic medicine.

Ammonia and its carbonate are powerful suffoc-
sive stimulants, and as such are frequently useful in the
advanced stages of asthma, bronchitis, &c. They act partly
by increasing the strength of the patient and thus allowing
him to expel mucus which has accumulated in the
air passages from his inability to speak them, and which if
not relieved might quickly prove fatal by producing asphyxia.

According to Dr. Watson a great许多 the danger be ap-
prehended in the advanced periods of the disease (Bronchitis)
is that the patient may not have muscular power enough
to dismount his air passages of the mucus that accumu-
lates, to draw a strong breath, and to achieve a vigorous
cough. ** Although Ammonia has in all probability no
directly expectorant property, but simply acts of giving a
"help to the muscular power," yet affirms expectoration.
frequently follows its employment in such cases, the symptoms of cedema and coughing have begun to show themselves. Other irritable stimulants will make probably act equally well as expectorants under similar circumstances. Ammonia is, however, expected of some persons to produce a local influence on the Bronchial mucous membrane.

3. The third division of general expectorants or restoratives.

Laxative and anthyring medicines have long been used in the treatment of pulmonary affections. They can scarcely perhaps, as a class, be considered expectorants in the literal sense of the term, (though some of them cause increased secretion from the bronchi), but in aiding the excretion of expectorations, for of aiding the coughing of the mucous, they allow the patient to re-constitute his strength, and the secretion, at the time to accumulate, to that at length when coughing occurs the expulsion of the contents of the bronchi is more easily accomplished.

The principal expectorating medicines are 

Opium, Mucous, Sagewort, 

bark, Balsam, and Lobelia.
Headland on Medicine and their money actions.
Opium. This valuable remedy enters into the con-
osition of almost every cough mixture and is
frequently in many cases the active ingredient.
It operates in two ways. 1st of increasing mucus secre-
tion from the bronchi. 2nd of allaying irritation and
acting as an anaesthetic. The first of these actions
that way of promoting the secretion of the mucus mem-
brane of the bronchi, has been denied by some high
authorities. Dr. Christian states that curative
action of a medicinal dose of Opium, the mucus secre-
tion are suspended. Dr. Ferreira also of opinion
that it checks exhalation and mucus secretion.
Dr. Headland states that Opium in small doses,
large irritability and diminishes spasms and
has an indirect expectorant, but that in larger
doses it acts as forcefully as to render respiration
difficult and expectoration impossible. On the
other hand Dr. D. Thomson states that it is erroneous
to suppose that Opium diminishes the bronchial es-
piration, but that in the contrary it not only assists
other expectorants, but promotes expectoration when
given alone, an action, however, which is to be attri-
...ated partly to its increasing the natural secretion of the mucous membrane, partly to its sedative property of diminishing the irritability of the mucous membrane. This last statement is quite in accordance with what I have myself experienced, from small doses of opium (as 2 grains) frequently repeated, for when thus taken it has certainly caused an increase of the natural secretion of at least the upper part of the respiratory tract. It would be difficult to form whether this extended into the bronchi, but if it cause increased secretion in one part, it will in all likelihood, of course, over the whole membrane, and it is, to say the least, improbable that it would cause an increased secretion in one part, and diminish it in another part of the same membrane. Opium is stated by those who not only deny that it operates as an expectorant itself, but hold that it diminishes mucous secretion, to increase the expectorant action of other medicines help- ing them. It is difficult to conceive how two medicines opposed either in their action when given separately, should, when combined, promote secretion to a great or extent than can be effected by the expectorant alone.
With all deference to the distinguished authorities who are of the opposite opinion, I think that the explanation of this acting upon the increasing the expectation of opium, and increasing the action of other remedies, is owing to the precaution itself (in small doses) the property of increasing the secretion of the mucous lining of the respiratory passages.

The second mode of action of opium, that of gall-laying irritation and opium, it professes in virtue of its aromatic properties. It diminishes the sensibility of the bronchi to irritations, whether of cold or of accumulated secretions or foreign matter.

In cases where there is a frequent and distressing cough with difficult expectoration and nearly expectoration, opium, if allaying cough for a time, allows the secretion to accumulate in such quantity as to be more easily expectorated when the cough does occur. The mucus already existing in the bronchi well of the larger坐落 then become somewhat thickened, which will in part account for the incresed consistence of the spu intense observed to attend the use of opium as an expectorant.

When given in larger doses, as a hypnotic, it also proves beneficial, for, although (in large doses) it stops
Gregory: Conspectus Mathematicus.
expectation for a time, afterwards it promote it and effectually. The strength will also be recovered after sleep, so that the act of expectoration will be performed with greater ease and facility.

The great value of Opium in pulmonary affections, is however, more due to its secreting a cream as regard the cough, and all the pain and distress attending it than to its promoting the secretion or expelling mucus from the bronchi.

Hyoscyamus is frequently used as a sedative in affections of the chest. It does not appear to prepare local action on the bronchi, but simply acts as a sedative or soporific. It is much inferior to, and more easily used than Opium for this purpose, though it may be advantageously substituted for it in cases where the drug produces some disagreeable effect, or to avoid the constipation attending the use of Opium, for a free state of the bowels acts beneficially by tending to relieve the bronchial symptoms.

**Conium maculatum.** The actions of this plant in one or two medicinal doses have not been accurately determined.
It is safe, however, sedative and anodyne properties and is highly recommended for use in the treatment of coughs. It probably acts in a similar manner to the other remedies of this class. It is seldom employed in these affections in the present class; this is partly owing to the uncertainty or want of its preparations as usually made.

Lobelia inflata. This plant when given in large doses acts as an emetic and as such will increase the mucous secretions of the bronchi; but it also acts as an antispasmodic and expectorant when given in smaller doses. It is usually given in these smaller doses and therefore belongs more properly to this class of drugs. It tends to those acting on the mucous membrane of the bronchi which they resemble. It is said to increase the expectoration without exciting cough. From its antispasmodic action, it will be most applicable to those personal affections at hand with spasm of the bronchial tubes as asthma. It has not come into general use as an expectorant.

Besides the three leading general expectorants already mentioned and described, another class of cough actants—has been occasionally used in
affecting the bronchi. They are sometimes employed to diminish serous secretion. Long continued and profuse secretion and discharge of matter from the bronchi, like other chronic discharges, tend to waste the constitutional vigour and waste down the strength of even the strongest individuals: it would therefore be consistent both with sound theory and practice to endeavour to diminish this drain upon the system.

After the continuance for some time of this increased secretion, the means tending to the bronchi may be considered to be in a weak and relaxed condition, setting up the discharge partly from habit, partly, and like other surfaces in a similar condition requiring stimulation. All these substances already contain and elude together as stimulating effects, act partly in this way, for after being absorbed they come into immediate contact with the membrane, (as is proved in the case of some of the odours being perceptible in the breath) and on thus entering by acting on it locally. The ultimate action of some of the local or superficial results also, as chloroform, is to diminish the secretion from the bronchi, though they, at first come...
increased secretion. Other remedies possessing astringent actions, as Acetate of Lead, have been used to check inordinate bronchial secretion. The use of the Acetate of Lead for this purpose has been of decided advantage in some cases. Probably the vegetable astringents, Rice, Catarrhus, and Taracea, might prove serviceable under similar circumstances.

Diphtheria and smaller irritants also under these circumstances cause, indirectly, a diminishing bronchial secretion and expectoration.

In some cases where a severe and long continued disease has prevailed as Bronchitis, a very painful sensation of soreness in the lumbar region and expectoration has followed. It is doubtful, however, whether this could be safely and successfully initiated. In most cases it would certainly cause a dangerous reduction of strength and I am not aware that it has ever been put in practice.

Expectorants have little power in the matters already quoted in the bronchi, in altering their physical properties thus rendering them more easily expellable.
It is probable that the expectation may be encouraged throu-
gu of the patient's inhaling a mixture of water vapor, and the remedies which a dry cough (catarrhal) will have an indirect action of expelling it. If allowed to remain for a longer time in the bronchi, where it will lose part of its moisture if the current of air passing over it (supposing it does not entirely block up the tube), the expectoration will influence the quality of the mucus as secreted—spasm of the muscles of inspira-
tion, and expectoration becomes a thinner fluid to be forced out. It is also altered in character—from purulent to mucous—by the stim-
ulating expectorants, in some cases.

As cough usually precedes expectoration, it might be, and indeed has been, proposed to give medicine rect-
g to excite cough (if any such exist) in order to promote
expectoration, matter contained in the bronchi. A fitly
coughing would no doubt clear the air passage, but it is
affected much more safely by the natural efforts, to some
extent, than accumulation has taken place to such an extent as to
cause irritation, besides cough is usually the symp-
tom by which the patient complains most, and gives most
annoyance and pain, and it is generally too frequent rather than otherwise. Ammonia however may be an aid to act in this way, when given in the last stage of Bronchitis, when debility is so extreme as to prevent the patient coughing freely.

Having now treated briefly the principal remedies reputed to possess expectorant properties, it remains for me to consider their applications in cases.

Expectorants are never used as general antiphlogistics, of causing a discharge from the bronchial lining membranes. They are not used at all in a healthy state that membrane, but only in pulmonary disorders, when it is in a state of irritation or inflammation. So, in this respect differing from most other curative remedies. In the most part they are used only as precipitants, though the stimulating expectorant and astrigent undoubtedly act as curative agents in some instances. In routine practice expectorant are given in almost all cases of cough, without regard to its cause or the lesion giving rise to it.

From this class of remedies being so extensively used, it can not reasonably be asserted that they are rel
in many cases, the great cause of the universal use of expectorants and cough mixtures may be readily inferred from the circumstance that in "dry cough," i.e., one unattended with expectoration, or without slight wheeze, is always more distressing and attended with more pain than when the expectoration is present.

Besides being given directly to promote expectoration, they are very frequently administered to allay a distressing or severe cough, without reference to theexpectoration. In the quantity of the discharge is never wished to be increased so long as it is wet and unthickened, and without much coughing; in the contrary, the increase of the expectoration under such circumstances, along with increased aperientitude, is one of the surest signs of a return to health.

With these introductory remarks, I will proceed to the uses of expectorants in the different diseases affecting the Pulmonary organs and in the different stages of their affection — and 1st of the use of expectorants in Bronchitis. It is in this disease that expectorants might, on theoretical grounds, be considered most useful, as acting direct on the part affected, and it...
consequent of the disease in which they have been exerted are not easily and with most advantage.

In the early stage— at the commencement of the inflammation— when the membrane is yet dry, tender, and very sensitive to the action of the air, that class of specific remedies which acts mechanically by lubricating and protecting the membrand from irritation, from without will be found most beneficial, viz., Decoctions and Extracts, such as the various Preparations, Epsom Salt, tinctures of aloes, etc. The application of hot water also may often be used with benefit in this stage, and it is safer an advantage over the puncture— that it acts in the whole respiratory tract— in the early stage of the disease; however, in such cases, as the inflammation is principally confined to the upper part of the membrane, as it usually commences above and extends downwards. These remedies also, which have the power of increasing activity, the mucous secretion will be of advantage. When the best, when as is usual, the case at the commencement, there are sharp febrile symptoms present, are Antimony and Quinine.
especially the former, for they fulfil a double indication, to act as antiphlogistics and anti-stimulants as well as expectorants. After the inflammatory symptoms have been somewhat subdued and the bronchi begin to pour out a secretion, opium may be combined with the Speciosa or Antimony as already intimated, cough it has to intensify the secretion, which is at first thin and irritating. It must however be given cautiously at first and its effects watched. It is indicated if there is any blueness of the lips, cheecks, or a thin rapidness in the respiration, and its action is most beneficial, with a decrease of the secretion.

In the acute and chronic bronchitis in which there is usually present inflammation or a thick obstructive mucus, frequently more or less mixed with purulent matter, the Antimonials and emetics are most beneficial, with a complete clearing of the bronchus. Under their use the expectoration frequently diminishes in quantity and the patients strength increased.

In the chronic state, when the expectoration is excessive and much exhaustion and emaciation present, more powerful remedies than these may
be employed; these are, which possess directly a stimulant property, the best of these is the Acauley’s lead, which may be given alone or in combination with quinine, as in the pill. Flumeti syrup.

In chronic cases of this disease in the aged, and other similar symptoms, quinine and quinquinae begin to show themselves. The best results follow the administration of ammomia and its preparations, or wine, especially when the expectoration is checked from inability in the part of the patient to command the requisite muscular power.

The mode of preparing these remedies, under such circumstances is obvious, and has been before explained.

Opium is generally combined with the expectorants in this and other affections of the respiratory organs. It will be found most beneficial when the cough is frequent and distressful, as it alleviates these and allows the patient to take some rest, which was formerly only the exception from its urgency. It is one of the most useful remedies for countering irritation and alleviating cough in chronic cases unattended with constitutional excitement, but it is difficult to discontinue it after having been used for some time.
Estufant. The clausky expectorants which have been found most useful in this disease are those which cause nausea and vomiting. The paroxysms generally are frequently or even generally terminated by vomiting after expectoration, a little combined with dyspnoea. The observation has no doubt led to the use of these remedies which facilitate the natural terminating the paroxysms. The best macerating expectorants that can be given are belladonna and tincture of antimony— in small doses frequently repeated. When the expectoration is sputum more thorough preceding it may protrude and occur, and these have been found of more service. By some they are recommended in ordinary cases of asthma, but they should not be given when there is any determination to the head, as the situation tends to the congestion, which necessarily occurs during paroxysms, might induce convulsions which is one of the most serious and dangerous complications throbbing cough. — Spasmodic asthma. In this decide either is not necessary any organic disease in the lungs or lungs themselves. Decoctions of poppy seeds
...modic constriction of the tracheal tubes. It can
be seen if he said that expectorants are generally in the
disease; at least those of them which directly influ-
ence the expectoration; but as the expectorant is freed
first (in the humoral variety) terminated of free expecta-
tion, these remedies which have the power of cutting
short the expectorant may be considered as incorrect free-
torants—though he in chronic bronchial diseases is the
consequence and not the cause of the relief to the dysp-
nea. It is in this disease that the vapor of Thoro-
ronium and Tobacco have been found particularly use-
ful. Thoroconium in some cases of Spasmodic Asthma
almost immediately arrests the expectorant, in other cases
however it entirely fails to do so, or to afford relief.
It is said to succeed best in those cases in which it can
free expectoration, but as a rule stated the expectoration
is consequent upon the relief afforded to the breathing; for
relaxation of the spasm in the tubes.
Induction of the vapors of Chloroform has, in some cases,
been found alone to relax the spasmodic constric-
tion, and afford complete relief. Induction of
vapors of buming water is, in other, cases of great
service. Remedies profiting on one vague and indefinite
nomic properties in many cases are very beneficially,
especially sulphuric acid and bismuth, either exp-

In Plutony there is little or no expectoration
attending the cough, unless the disease is complica-
ted with Bronchitis or Pneumonia. As there is no ef-
fecction in the bronchi in this disease, or stowing expect-
rating the lung itself, there is no indication for the
use of expectorants (except perhaps such as tincture of

When complicated with Bronchitis the expectorants
indicated in that disease must be employed.

Pneumonia. This disease consists essentially in
an eruption of hyperaemia into the air vessels of the
large and finer branches and gives congestion there.
As the expector art and bronchitis do require rather
to be removed by suction or by expectoration, it might
therefore be supposed that expectorants here would be
decided service. These remedies however affect all
the bronchi and have no influence over the ultimate
air vessels or finest branches. This true that an
* Prof. Simpson's Contributions to Obstetric Pathology and Practice (Part I)
Remedy possessing an expectorant action was but rarely used in the treatment of pneumonia, but its good effect was not, with any other remedy, ever ascribed to its expectorant action, but rather to its power of dulling inflammation and acting as a centric stimulant. Glycerin and ether are sometimes given during the course of the disease, and when it has become chronic, stimulants may be employed to promote excretion in the way previously explained.

Of late the use of Chloroform has been employed in the treatment of Pneumonia, by some of the German physicians, and besides other advantages resulting from its use, it is said that in 23 cases treated by Winterstaff, in all without exception, the cough was lessened of the wheezing, the intervals between the coughs lengthening, and the cough itself being less violent and the expectoration less, and gradually diminishing in quantity.

If similar results are obtained on more extended trial, Chloroform will no doubt come into general use in the treatment of Pneumonia, and prove as valuable an aid in the work as any of the other means already employed.
Phthisis pulmonary is. It can not be a matter of surprise that in this disease which very frequently resists all kinds of treatment, expectorants should have been extensively employed. In common with many other remedies, possessing the most opposite properties, expectorants have been used, not only as palliatives to the symp-
toms, but as capable of curing the disease itself.
The earliest indication has been endorsed to be carried out by means of inebriation. This class of remedies has long been recommended in the early stages of Phthisis to effect mechanically the distention and expelling of the tubo-
acular matter lodging in the air passages and smaller branchial tubes. It is impossible however, that this can be effected in the way in which the older authors rep-
tended— by compounding the drugs among a preconceived mixture and there is an evidence of its taking place at all except in child. Other drugs also, at one time professed a reputation for the cure of Phthisis; other the most in vogue were combinations of Chlorine, and Tan, both in the form of purges and as two water.
Allowing that cures and occasional the use of these substances, it does not follow that there were really
cures of Phthisis, for the wrong diagnosis of this from
other diseases—especially Bronchitis—was then much
lip certain than now, and even at the present day with
all the assistance that can be derived from accurate
signs, Bronchitis is sometimes omitted in the ad-
anced Phthisis—in some cases.

Be this as it may. For unless the cough and the rehabs-
tions of Phthisis have long ceased to have a reputation for
the cure of Phthisis, though in some cases their use is of
some mild benefit. The principal way of expectorating in
these cases is to alleviate cough. For this purpose emollients
and demulcents may be employed with occasional and partial
relief, but a more certain remedy for this purpose is taking
of its preparations. In many cases this drug is almost inde-
pendable in order to allow the patient, harassed and ex-
hausted by frequent cough, to obtain a little rest and sleep.
In some cases where the expectoration is very profuse at
times it may be employed with advantage.

Some accomplished physicians maintain that expecto-
rants should not begin in the early stages of Phthisis
as they tend to keep up the expectoration. This opinion
is founded on the observation that when the expectoration
is
If at this (or indeed any) stage, the expectoration becomes more scanty, and the cough preceding it, though by frequent, is more distressing to the patient and attended with more pain; therefore it is argued that as this pain accompanies a salutary change and amendment in the disease, it should not be interfered with by art. It is difficult to conceive how any sedative or analgesic remedies given to diminish the cough or pain attending it, can, under such circumstances, have any tendency to arrest the natural progress towards cure. The slight increase of the viscous secretion of the bronchi, can certainly have no such deleterious effect, and it will increase very little the absolute quantity of the sputum. I think therefore that such precautions should be given, as there is so good ground for the apprehension, that they will arrest the cure; except they should interfere with the digestive functions: if this should be the case, they ought certainly to be discontinued, or other substitutes for those that disagree with the patient.