In the following Thesis, I have endeavoured to give a summary of what is best known of the nature and properties of the plant Belladonna. As one of our indigenous medicinal herbs; and as a powerful poison: as well as a valuable remedial agent: capable of being applied to so many different uses; its study affords peculiar interest; and of late years our knowledge of its properties has been much increased. In these pages I have attempted to describe, the history and characters of the plant; its preparations, and their effects, in medicinal and poisonous doses: its antidotes, and antidotal applications, and lastly its varied uses in Surgery, Medicine, and Gynecology. The description is confessedly an imperfect one, it has been written in parts and at different periods, as the duties of extensive practice would allow. The field of inquiry is not yet exhausted, far from it, it will doubtless hereafter yield greater results when more extended clinical observation, and
improved modes of research shall enable us to obtain them.

R.A. Lambert.

Dublin: April 2nd 1876.
Thesis on Belladonna.

History - The plant Belladonna, has long been known both as a poison and a medicine; although the exact period of its introduction as a remedy is uncertain. The earliest undoubted notice of it occurs in Fragus: A.D. 1532, he calls it "Solanum hostense rizum."

It is supposed though on insufficient grounds, to have been the Struxus pavros (arboks pelan) of Dioscorides; and the Mardnayopas of Theophrastus; and also the third sort of "Struxus solarum" of Pliny. The name is of Italian origin, and according to Merab is derived from the fact that the Italian ladies were formerly in the habit of using a lotion distilled from it as a cosmetic. It is also known in this country by the names of "Deadly Nightshade" and "Dewale."

Foreign names are: (Ital). Belladonna, (Frn). Belladone; (Germ). Vollhirsch.
(Russ). Krasavitsa, Odumity; (Arabian) Irubas, Saleb; (Hindoo) Sug-wuggor &c.
To this plant the remarkable and fatal effects produced on the Roman soldiers after their defeat by the Parthians, have been attributed. Shakespeare is supposed to allude to it under the name of "the insane root." It is said to have been used by thieves in the middle ages, to aid in their depredations, as Strenoumum and Haschish are employed at the present day in eastern countries. Under the influence of this drug, their victims retained no consciousness afterwards, of what had occurred, and so were unable to give evidence against their plunderers. Among Continental writers, it has been advocated by Dr. Tourneau, Hufeland, & others. In this country Dr. Harley and Fraser have made it the subject of experimental research.
Botany. - "Calyx, 5-partite, corolla hypogynous, funnel-shaped, campanulate, limb plaited, 5-10 cleft, Stamen 5, inserted into the lower part of the corolla, exerted or nearly so, Filaments filiform. Anthers dehiscing longitudinally. Ovary 2-celled. Seeds many and subreniform. Embryo in fleshy albumen, subperipherical, arched or annular." (Erdlicher).

The herb Atropa Belladonna belongs to the natural order Atropaceae, and to the class and order Pentandria. Monogyenia of Linnaeus. Its habitat is generally shady places; the borders of woods; uncultivated lands. It is said to prefer a calcareous soil. It grows generally throughout Europe and Asia.

The root is perennial, branched and fibrous, when cut across it is soft and white when fresh, and grayish-white when dry; it has a sweeterish
slightly bitter taste, and faint odour. The stem is annual and herbaceous, branched, about three or four feet in height, straight, round, and slightly downy, of a reddish tinge. The leaves occur mostly in pairs (which are generally unequal) but may be alternate, they vary in length from 2 to 5 inches, ovate and acuminate, soft and thin, margins entire, slightly downy behind, smooth elsewhere, they are supported on a short leaf stalk. When dry they become of a brownish or greyish green. They have a slightly bitter taste and faint odour. The flowers occur solitary, axillary, they are nearly an inch in length plumish internally and externally except near the stalk where they are greenish. They appear about the end of June and beginning of July. The fruit ripens about the beginning of September, it is of a brownish black.
colour, somewhat resembling a black cherry in appearance, and size. Its shape is round, and somewhat flattened; it rests on a large and extended calyx. It is bilocular. The pulp is mucilaginous, and when ripe is of a sweetish, though not agreeable taste.

The seeds are small, numerous and uniform.

Chemistry. The composition of the Belladonna plant has not yet been determined with sufficient accuracy. Numerous analyses have been made by different chemists, with varying results. The leaves were analyzed by Melandri in 1808; the juice by Vanqueelin in 1809 and in the same year the dried herb was analyzed by Brandes, who was the discoverer of the alkaloid Atropia. Later analyses have it is said shown the existence of similar principles.
Analysis of the Belladonna Plant (Brandyd)

<table>
<thead>
<tr>
<th>Substance</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supermalate of Atropia</td>
<td>1.53</td>
</tr>
<tr>
<td>Resedotoxin with malate of Atropia</td>
<td>16.05</td>
</tr>
<tr>
<td>Phytocolla (or Phytumacol) - a</td>
<td>6.90</td>
</tr>
<tr>
<td>Nitrogenous substance insoluble in Alcohol</td>
<td></td>
</tr>
<tr>
<td>Wax</td>
<td>0.70</td>
</tr>
<tr>
<td>Chlorophyll</td>
<td>5.84</td>
</tr>
<tr>
<td>Gum</td>
<td>8.33</td>
</tr>
<tr>
<td>Starch</td>
<td>1.25</td>
</tr>
<tr>
<td>Albumen</td>
<td>10.70</td>
</tr>
<tr>
<td>Lignin</td>
<td>13.70</td>
</tr>
<tr>
<td>Salts</td>
<td>7.17</td>
</tr>
<tr>
<td>Water</td>
<td>25.50</td>
</tr>
<tr>
<td>Loss</td>
<td>2.05</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

The Alkaloid Atropia, when pure, occurs in colorless, acicular crystals. It has been analyzed by Liebig & others, its formula is either \( C_{34}H_{23}NO_6 \), or \( C_{17}H_{23}NO_3 \). It is obtained in largest
quantity from the Root, though all parts of the plant contain it. Twelve ounces of the root, are said to yield only twenty grains of the alkaloid, but it is probable that much of it is lost in the process of preparation. The British Pharmacopoeia directs it to be prepared as follows—

"Take of Belladonna Root recently dried and in a coarse powder 2 lbs. Rectified Spirit ten pints. Staled Lime one ounce. Water half a fluid ounce. Dilute Sulphuric Acid a sufficiency. Carbonate of Potash a sufficiency. Chloroform three fluid ounces. Purified Animal Charcoal a sufficiency. Distilled water ten fluid ounces. Mace rate the Root for 24 hours in two quarts of the Spirit with frequent stirring. Transfer to displacement apparatus, and exhaust with the remainder of the Spirit by slow perco-
Add the Lime to the Tincture, placed in a bottle, and shake occasionally several times. Filter, add the dilute Sulphuric acid in very feeble excess, and filter again. Distil off three-fourths of the Spirit; add to the residue the distilled water, evaporate at a gentle heat, but as rapidly as possible, until the liquid is reduced to one third of its volume and no longer smells of Alcohol; then let it cool. Add very cautiously with constant stirring a solution of the Carbonate of Potash so as nearly to neutralize the acid, care however being taken that an excess is not used. Set to rest for six hours, then filter, add Carbonate of Potash in such quantity that the liquid shall acquire a decidedly alkaline reaction. Place it in a bottle with the Chloroforin, mix well by frequently repeated brisk agitation, and pour the mixed
liquids into a funnel furnished with a glass stopcock. When the Chloroform has sublimed, draw it off by the stopcock, and distil it on a water bath from a retort connected with a condenser. Dissolve the residue in warm rectified Spirit; digest the solution with a little Animal Charcoal; filter, evaporate and cool until colorless crystals are obtained. Atropine, when pure, is permanent in the air, and without any odour. As in shops however, it is never kept but damp, being slightly deliquescent. It fuses at a moderate temperature and a heat much above the boiling point volatileizes the most of it unchanged in closed vessels, but in the open air it first swells and then shrinks and takes fire burning with a bluish flame. It is entirely soluble in pure ether, in rectified Spirit its solubility is 1 in 8 and
[Handwritten text not legible]
in water 1 in 500 parts, it is said to be more soluble in cold than in hot water. Its solutions have an alkaline reaction, and a slightly acid but bitter taste. Strong alkaline solutions decompose it with the aid of heat, and ammonia is given off. The acids neutralize it, forming crystallizable salts (of which the sulphate is easiest obtainable in the crystalline form) and from solutions it is precipitated by alkalies.

Mode of preparing the Sulphate of Atropia.

"Salt of Atropia" Two drachms
Distilled water  Half an ounce
Dilute sulphuric acid: a sufficiency.

Mix the Atropia with the water, and add the acid gradually, stirring them together until the Atropia is dissolved, and the solution is neutral. Evaporate to dryness at a temperature not exceeding 100°.

Its solubility in water is 1 in 21.
was first employed in England and is now generally used instead of the alkaloid, from its greater solubility. It dissolves immediately in water, while Atropia requires the aid of spirit to increase its solubility. The solutions both of Atropia and its sulphate should if possible only be made when required, as they rapidly undergo change if made for any time.

Atropia is contained in the pharmacopoeias of U.S., Austria, & Belg., and Sulphate of Atropia. Prus.

Tests for Atropia. It leaves no ash when burnt with free access of air. Its watery solution has an alkaline reaction, and gives a citrine yellow precipitate with tincture of gold. Pseudotoxin. This substance was obtained by Brandes from the watery extract of Belladonna. It is of a brownish-yellow colour.
soluble in water, but insoluble in absolute alcohol and ether. It is also coloured green by salts of iron, and is totally precipitated from its watery solution by salts of lead, and tincture of galls. Belladonna in an alkaloid has been described by this name, by Luebbering, stated to be distinct from atropia. It is crystallizable and has an ammoniacal odour. It is said to consist of C. (28.5), H. (22.4), N. (32.1), O. (17.0). The crystals contain three equivalents of water of crystallization. Two grains are said to have caused extreme heat of the throat, and constriction of the larynx.

Atropic Acid - This name was applied by Richter to a volatile crystallizable acid, said to be found in the Belladonna plant. It somewhat resembles benzoic acid, but salts of iron do not precipitate it.
Parts of the Plant in Use—The B.P. employs the "fresh leaves and branches to which they are attached; also the leaves separate from the branches, carefully dried; gathered when the fruit has begun to form, from wild or cultivated plants in Britain; also the dried root of the plant collected in early spring, cultivated or imported." Prior to 1864, the B.P. contained only the leaves and root of this and various other plants in the Materia Medica. It has been shown however that the active properties of plants are by no means exclusively contained in the leaves but on the contrary that an extract prepared from the tender stalks is the more powerful. The plant selected for experiment was Belladonna, because with it extremely accurate results could be obtained by comparing the actions of two extracts on the eye.
From the results of these experiments the B.P. (1864) ordered the tender stalks as well as the leaves for making extracts from fresh plants.


The root is in all except Lond. & Edin.

Preparations. The following are the preparations of the British Pharmacopoeia.

1. The Tincture. This is the best preparation of Belladonna, it is prepared from the leaves, its strength is 1 in 20. Phar. Lond. 1 in 9½.
Dub. 1 in 8; U.S. 1 in 7½; Aust. 1 in 5.
Belg. 1 in 5 by weight; but in others.
Belg. and France have an ethereal tincture, and Belg. has a tincture prepared from the fresh plant.

Dose of Fr. Bellad (B.P.) = 5—20 minims.

The Pharmacopoeia directs it to be made thus:

"Take of the dried leaves in coarse
powder 1; Proof Spirit 20; macerate 48 hours in 15 of the spirit agitating occasionally; pack in a percolator and when it ceases to drop add the remaining spirit; let it drain, wash and press the marc; filter & make up 20° 2° The Extract — This preparation will keep good for a long time; it is prepared from the leaves and branches; one grain is said to be equal to one dram in of the Tincture in therapeutic strength. 100 lbs of the herb yield 56 lbs of juice = 63 ounces of extract, while 100 lbs of the leaves when dried weigh only 16 lbs —

That Lord — The inspissated juice of the leaves; Edin — The clear inspissated juice of the leaves; Dub — The clear juice of the leaves coagulated by heat; filtered and evaporated; Aus — from leaves; Belg — with clear juice of the herb evaporated and mixed with the powder of the same so that the whole
can be reduced to Powder, also an extract of the herb with facula evaporated to dryness, also an aqueous extract from the dried root, and alcoholic extracts from the herb and from the seeds; Press from the leaves and flowering branches made with Spirit; Press Clarified juice evaporated; U.S. Same as T.B.P., also an alcoholic extract from the Powder of the Leaf, Those of Ept Bellad (P. B.) = 1/4 – 1 grain T.B.P. to 2 lbs of fresh leaves and tender branches, bruise in a stone mortar or suitable apparatus, and press out the juice, heat it gradually to 130°, separate the green coloring matter by a calico filter, heat the strained liquor to 200° & to coagulate the Albumen, and again filter, evaporate the filtrate by a water bath to the consistency of a thin syrup, then add to it the
green coloring matter previously separated, and stirring the whole together assiduously, continue the evaporation at a temperature not exceeding 140°, until the extract is of a suitable consistence for forming pills.

3° The Enplastrum — This is made of the extract with resin plaster, and rectified spirit, spread on calico, molleton, linen or a moderately warm iron should be used in spreading it. Its color is a deep olive brown.

U. S. Phar. Same as B.P. with alcoholic extract 1, resin plaster 2; Lond. Edin. Dub. 1 of extract in 3; Belg. with extract and oil of belladonna; not in others.

Process for Enplastrum Bellad. B.P.

Take of extract of belladonna 3; resin plaster 3; rectified spirit 6; rub the extract and spirit together in a mortar, and when the insoluble
matter has subsided... the
ear solution, remove the spirit
by distillation or evaporation,
and dry the alcoholic extract thus
obtained with the resin plaster,
melted at the heat of a water bath,
containing the heat until with
constant stirring the plaster has
acquired a suitable consistence;
yields only 3½ lb.

4° The Unguentum — It is made
with the extract and lard, its
color is a dusky brown; its use
colors the skin. In Bellad 30—30
to 3½ of lard has been recommended
instead and does not stain the
skin. Its strength is 1 in 6½ —

Lond. 1 in 9; U. S. came as B.P.
Belg. with dried leaves; Hier. "Crat." 1 in 10; not in others.
The B.P. directs it to be made as follows
"Take of Extract of Belladonna 1. lb. dry
with a few drops of water and add lard 5½."
5. The Liniment — This is prepared from the root, it is of a light reddish brown color, it is four times the strength of the extract.

Process for Lin. Bellad. B.P.

Tincture of the Powdered Root 20. Camphor 1.
Rectified Spirit 20. Moisten the root for three days, then pack in a percolator, and add sufficient spirit to produce with the camphor 20. A fluid ounce is equal to a solid ounce.

6. The Liquor Atropis — This preparation is colorless; its strength is half a grain to the drachm (1/120) if given internally the Dose = 1 minims. It soon spoils by keeping. The B.P. directs it to be made thus:

“Tincture of Atropis 4 grains; Rectified Spirit one drachm; dissolve and add water seven drachms; strew.”

7. The Liquor Atropis Sulphates — This is a new preparation, it is more suitable
for Ophthalmic use than the Liquor Atropiae, the quantity of spirit contained in which causes pain when applied to the eye; though a less quantity would be insufficient to hold the atropia in solution. This preparation also is colorless; like the last it is very prone to undergo change if kept; its strength is also half again to the drachm, the dose = 1-2 minims. The B.P. directions are "Take of Sulphate of Atropia, four grains; distilled water, one ounce; dissolve 8° The Unguentum Atropiae - Is cream coloured, each drachm contains one grain. Half a drachm may be used at one application. The B.P. directs it to be made thus. "Take of Atropia eight grains; rectified Spirit half a drachm; hard one ounce; dissolve the Atropia in the Spirit and mix with the card."

This concludes the official preparations.
The non-official preparations are—

1° Lin. Bellad. et Chloroformi—This is prepared thus. "Take of the Powdered Root 20; sufficient Chloroform to percolate 20. It mixes with oils, though not readily with spirituous liniments. It makes a clear solution, mixed with Eau de Cologne in the proportion of one to three—

2° Succus—"Take of the juice of the Plant 3; Rectified Spirit 1: mix and filter," the albumen should in the first place be removed by heat as it renders it liable to spoil. The Dose = 1 minima (= 1/4 gr. extract), gradually increased.

3° Suppositoria—Take of Extract Bellad. 2 grs; Stearine 13 grains by weight; mix and form into a cone for one suppository—

4° Atropine paper and Atropine Gelatine in books as proposed by Mr. Streitfeld and in bottles of
discs by Dr. E. Hart" are frequently used by Oculists to dilate the pupil; a small square or disc is introduced between the eye and the lower lid. A piece 1/8th inch square contains as much of the Sulphate of Atropin as one drop of a solution of grij to 3i. "Dr. Fleming's Solution" was: Atropin grij. Acid Hydrochlor. g.s. Esp. Rect. fl. Aquae fl. The dose is 10 minims for an adult, increasing the dose daily by 2-1 minims until it causes slight sore throat, dilated pupils, and dimness of sight. The dose for a Child is one minim for each year of its age, up to ten years. It should be given on an empty stomach. Incompatibilities. The chief are Caustic alkalies. Opium, and Strychnia. The 1st cause decomposition, the two latter are antagonistic. Preparations of the Calabar Bitter, and the Tabanosdi Plant, may be added.
Actions of Belladonna.—It is a powerful narcotic poison, more energetic in its action than any other Atropaceous plant known. Other plants of this order possess somewhat similar properties, as Hyoscyamus niger, Nicotiana tabacum, and especially Datura stramonium. Hyoscyamus is preferred generally as an internal remedy; Belladonna as an external application. We are in fact best acquainted with its external uses. It was arranged by Orfila among the "narcotic-acid poisons"; and by Taylor among the "cerebro-spinal" poisons of his division.

By virtue of its narcotic properties it is anodyne, antispasmodic, and sedative. Given internally it acts both as a stimulant, and a sedative of the nervous system. It has the property of inducing
relaxation in involuntary muscular fibres, as is well seen in its action in dilating the pupil: this however is probably through its action on the nerve centres. According to Brown-Séquard, Belladonna has an action on all unstripped muscular fibres, and Troussseau thought it acted on the unstripped muscular fibres of the bowels in chronic constipation.

Its physiological effects are, as determined by experiment, and clinical research:

I. On the Vegetable Kingdom. A watery solution of the Extract, has been found poisonous to Vegetables generally.

II. On the Animal Kingdom.
(a). Birds: Some birds are known to eat the seeds of the plant with impunity. The Extract however has been shown to be poisonous to them.
(b) Mammalia. Belladonna acts as a poison to mammals, but far less poisonously to the Herbivora than the Carnivora.

8 lbs. of the plant have been eaten by a horse without ill effects, and 16 ripe berries have been given to an Ass with scarce any effect.

On the dog, Belladonna causes dilatation of the Pupil; plaintive cries; efforts to vomit; a quietened state of the circulation; weakness of the posterior extremities; a state resembling intoxication; and death. Forty or fifty grains of the watery extract injected into the jugular vein of a dog have proved fatal.

On Man, its effects are as follows. In the first degree it diminishes sensibility and irritability. This effect is scarce seen in healthy, but is well seen in morbid states. A very frequent and sometimes the
earliest effect, is dryness of the mouth and throat, and frequently thirst. There may be nausea, and difficulty in swallowing. The other secretions and the pulse, are often not affected by it, but may be augmented. According to Mr. Bailey, it affects neither the stomach, or bowels, nor any secretion except the saliva.

In the second degree, Belladonna manifests both in healthy and morbid conditions an influence over the Cerebro-spinal system. It causes dilatation of the Pupils; presbyopia, or long-sightedness; with obscurity of vision, or absolute blindness; (anacrosis). Spectral illusions; hallucinations; injection of the Conjunctive sometimes slight deafness, or ringing in the ears; loss of sensibility over the face; confusion of mind, giddiness, and delirium.
which is usually of an extraordinary kind. Being generally extravagant and mischievous, it may be either combined with or followed by hyperemia, there may be active secretion and yet unconsciousness. Sometimes it is of the nature of somnambulism. There is also a febrile condition; with dryness of the mouth and fauces, difficulty in deglutition, and articulation; a feel of constriction about the throat; nausea or even vomiting; and sometimes redness & swelling of the face. The pulse is generally small and quick; the cutaneous, renal, and mucous discharges are often increased; an erythematous eruption resembling the rash of scarlet fever may appear on the skin. Irritation of the urinary organs may also result. Intense thirst is a usual accompaniment here also.
In the third degree somewhat similar effects are produced, to those already described, but more severe. The comatose state which finally supervened, where a sufficient quantity has been taken, may either prove fatal or if it be dispelled is often followed by another stage of wild delirium, while the pupil remains long dilated. Sometimes diarrhea, and colic-like pains, have been observed to occur after the narcotic symptoms have passed off, but these are rare, and seldom of much import.

The following were the chief symptoms among 160 soldiers, who were poisoned with Belladonna near Dresden: "Delirium, immobility of the pupil; almost complete insensibility of the eye to external objects; or at least confused vision, injection of the Conjunctiva, with
venous looking blood; protrusion of
the eye, which in some appeared dull
and listless, and in others ardent
and furious; there was dryness of
the lips, tongue, palate, and throat;
deglutition difficult or even imposs-
ible; nausea without vomiting; feeling
of prostration; hypothermia, syncope,
difficulty, or impossibility of standing;
frequent bending forwards of the trunk;
a continual movement of the hands
and fingers; gay delirium; a vacant
stare; aphonia, or confused sounds
uttered with pain; probably ineffectual
desires to defecate; kept a gradual
restitution, to health and reason,
and his recollection of what had occurred.

Of seven cases noticed by Periera,
the symptoms were as follows—

"Dyspnea of the Thoaces; a scarlet
eruption on the arms and legs;
Hydrasis, and, Besyopia; Delirium
and Phantasm; Convulsions and
paralysis; stupor or coma.

General muscular rigidity is an occasional effect of a poisonous dose.

According to Enge and others, the active principle of Belladonna is always absorbed and thrown off in the urine. Its topical effect seems to be that of an acid—though not a violent one.

As an internal remedy, it is chiefly used in diseases affecting the nervous system. According to Florence, the Tubercula Quadrigenina are the parts of the nervous centres upon which Belladonna, specially acts. He drew his inferences from experiments on Birds. It is perhaps improbable that it has a special action on any part of the Cerebro-Spinal System, though it undoubtedly has a pronounced action on the nerve centres as a whole. The victim of
poisoning by Belladonna does not sleep, though he remains unconscious afterwards of what he did whilst under its influence. The arterial tension, and hyperemia of the Brain, which it produces do not admit of sleep as in Opium poisoning. In this respect Belladonna poisoning resembles Alcoholic intoxication in some cases.

Its action on the Spinal cord also is well marked, and a staggering gait is one of the effects produced by a poisonous dose. This is due to its paralyzing effect on the Motor nerves. Dr. Fraser has shown experimentally that it acts as a stimulant to the Spinal cord, but that owing to its action on the Motor nerves, its tetanising effects through its influence on the Cord are not usually displayed. In frogs after the effect on the Motor nerves has
passed away, the influence on the cord becomes apparent. Besides if before the poisoning, one of the arteries is tied, so as to protect the motor nerves of that limb from the poison, on irritating the animal, tetanic contractions are excited in the protected limb. It also acts on the vesical centre in the cord, and retention of urine is a result of a toxic dose. Hence the employment of Belladonna in incontinence of urine, in many cases of which it is sufficient to effect a cure. It is a remedy however only suitable for this disorder as it occurs in the young. It possibly acts on the centres in the cord by which the sphincter vesice is kept closed, and so prevents that relaxation of it which is the cause of the nocturnal incontinence during sleep. It has also a sedative action on
the Heart, and is frequently used for this purpose. It is a good remedy in irritability of the Heart, and in functional derangement of that organ from whatever cause. Dr. Harley found that after the administration of a moderate dose of Belladonna, the arteries are contracted, but that when a large dose is given, this contraction is replaced by dilatation. The primary contraction is due to stimulation of the sympathetic system, and the subsequent dilatation to the exhaustion resulting from the previous overstimulation. According to Brown-Séquard, the resulting contraction is due to the drug exerting a powerful influence on the unstriped muscular fibres. Hence the value of Belladonna as a remedy in cases of simple cerebral anaemia, as in melancholia, for example, acting as a stimulant on the
Heart, and at the same time producing increased arterial tension generally, while dilating the vessels of the encephalic centres. —

Antidotes — The best antidote in poisoning by Belladonna, is undoubtedly Opium: the action of these drugs is in many respects antagonistic, and either may thus be used to counteract the ill effects of the other. Poisoning by Belladonna differs from that caused by Opium in the following respects. —
1° It produces excitement not coma.
2° It causes dilatation, not contraction of the Pupil.
3° The symptoms remain much longer, especially the dilatation of the Pupil. Most cases of poisoning with it arise from accident, as for instance children eating the ripe berries. The large majority of cases however recover under proper treatment.
We should first endeavour to clear out the stomach and bowels of any remains of the poison. Give an emetic of Cupri Sulph, gr. x, or the Sulphate of Lime, xx or xxx grs. (for an adult.) The stomach pump may be preferable in many cases. Some purgative will often be advantageously given, if much time has elapsed; such as colostrum and Salap, or a drop of Coton oil placed on the tongue. Cold may be applied to the head, either by icicles, or cold evaporating lotions, while Opium is to be administered in some convenient form in quantity proportionate to the urgency of the symptoms, and repeated at short intervals according to the effects produced. The subcutaneous injection of 1/3d or 1/2 gr. of Morphia (repeated if necessary) may be had recourse to, or an Opiate emulsion may be administered. Should there be any
indications of the Comatose stage, give Ammonia internally, while the limbs and body are rubbed with stimulating liniments. The mineral acids, (given after evacuation) have also been recommended, as well as the decoction of Rutgalls, and Green tea. Quinine in moderate doses may be given for a few days afterwards. Bromide of potassium and Chloral either alone or combined, have seemed of service, in quieting the furious delirium which sometimes occurs in these cases. Lapsoracidi and its alkaloid, Pho-carpine, have lately been administered as antidotes in poisoning by Belladonna. The former in physiological action are diaphoretics, dilators, and produce hyperosmosis and myopia. In some cases of Belladonna poisoning in University College
Hospital the alkaloid Pilocarpine was injected in gr./3 doses with apparently the effect of counteracting the effects of the Belladonna. While the patients were under its influence the physiological actions of Saborandi could not be produced by even very large and what under ordinary conditions would have been dangerous doses of that drug. Of the two however Belladonna seemed to be the more powerful and intense in its action.

Antidotal applications: 1. Opium

In bad cases of poisoning by this drug it is undoubtedly the best antidote, although its employment is not indicated in every case. The subcutaneous injection of Atropin is the usual mode of administering it; the patient dazzy, comatose, and insensible to external stimuli or other remedial measures, we inject gr./½ Atropin subcutaneously, then in from 10-20 minutes the
See Medical Times and Gazette Feb 15, 1873.
effects are manifested, the pupils begin
to dilate: the face becomes flushed;
the pulse increases in strength while
the respiration becomes softer and
free from stertor. It usually exerts
its full effects within two hours.
Should the coma be only partial we
may inject 1/4 at first, and repeat it
if necessary.

This treatment as a rule is not
followed by any bad effects, its
benefit is most marked where pro-
found coma exists. We have in fact
no other remedy in such cases.

Generally the patients for sometime
afterwards suffer from paresis,
dryness of the mouth and fauces, di-
phoria, &c. but these symptoms soon pass off.

Dr. Johnson who treated upwards of
300 cases of Opium poisoning came to
the following conclusions with regard
to the use of Atropine:

1. That in mild cases while the ordinary
remedial measures will suffice for recovery; yet even here the greatest caution is necessary. First urgent symptoms supervene, and as a rule of these be great drowsiness with contracted pupils after evacuation of the stomach, and moving about of the patient, it is advisable to bring the system under the influence of Atropine at once.

3. The state of the Pupils is of the first importance, as whenever they are contracted to a pin's point there is danger, although the patient for the time may seem but slightly affected. Sooner or later, Coma inevitably comes on. It is, therefore, advisable in such cases to use Atropine at once.

4. In cases where the heart continues to do not respond to the cold douche and moving about the patient, it is not only useless but injurious to persist in moving him about, as this only increases the expiration, which is one of the greatest
dangers in Opium poisoning. The best treatment in such cases, is to place the patient in the horizontal position and inject the Atropine subcutaneously and if necessary assist with artificial respiration, and in case of exhaustion to strengthen the circulation by applying warmth and counterirritation to the limbs, and by the administration of stimulants such as coffee, ammonia, brandy &c. internally.

2° That in all cases of profound coma from Opium poisoning, with perfect insensibility, firmly contracted pupils; and the bronzous breathing, Atropine should be exhibited at once, and the Patient carefully supported afterwards by the administration of coffee, ammonia, & stimulants.

3° That, when the System is fairly under the influence of Atropine, with respiration tranquil, however slow it may be, it is undesirable to interfere
See New York Medical Journal Aug. 1874

See Philadelphia Medical Times Nov. 1873
by artificial respiration, as it only embarrasses the breathing, and interferes with the tranquil sleep, which usually follows the exhibition of Atropin.

As regards the quantity required, from the observations of Dr. Farre, gr. 1/14 of Atropin seemed to be required to neutralize gr. 1/1 of Morphine, or its equivalent of Opium.

Dr. A. Lucius, from 20 other cases thought 1/32 to 1/32 (gr.) sufficient. Dr. W. Mitchell gave three 1/3 grain injections of Atropin in poisoning by gr. 1/4 of Morphine. The patient recovered. It is perhaps best as a rule to inject moderate doses and to repeat these until the Pupils are sensibly dilated, and keep them so until the symptoms disappear.

According to Dr. Sehèll and others, the action of Emetics (which in severe cases of Opium poisoning are insufficient to excite vomiting) may be induced by the hypodermic injection of Atropin. He therefore recommends the combination of
Both modes of treatment. He does not think it necessary to push it to the extent of dilating the pupils, but merely to give sufficient to stimulate the nervous centres, from which the pneumogastric arises. To that degree of action necessary to keep the heart and lungs in motion, until the system can rid itself of the poison. Dr. Strychnia. Belladonna is antagonistic in action to this drug. Though other antidotes are generally preferred in cases of poisoning by this latter—in poisonous doses Strychnia causes severe and prolonged convulsions which may lead to exhaustion and death from the loss of nerve force induced. So thus, the congestion of the cord caused by it is probably due also—Belladonna, by its stimulant action on the spinal tends to remove or diminish the congestion caused by Strychnia, as well as the exhaustion which follows on the convulsions produced by that drug.
3. The Calabar Bean (Phyostigma Yaba). The antagonistic action of Belladonna, with this drug, is well seen in experiments on the Pupil, the latter having the opposite effect of causing contraction. Its peculiar properties were discovered by Dr. Fraser & Angefl Robertson (the former in 1862 noticed its action on the Pupil) if a little of the tincture of the extract (gripezi) be applied to the eye, extreme contraction of the Pupil with myopia is rapidly induced, this is caused by the action of the Bean, in stimulating the 3rd nerve, and causing a temporary spasm of the Sphincter Pupillae and ciliary muscle. It has the property of counteracting for a time, the dilatation produced by atropin. Thus if we introduce a little of a strong solution into the eye while the Pupil is dilated to the utmost, with atropin, it will gradually cause it to contract to its natural size, or even less, if a weak solution only of atropin be
been used. This effect however is evan-
escent, and passes off in a few
hours, as the Atropin resumes its
power in causing dilatation.
Mr. Fraser has given a good account of
the antagonism between these drugs,
and that this holds both in their
actions on the vascular system, and
on the contents of the encephalon.
Belladonna acts as a stimulant
in cerebral depression and inactivity
while by the use of Hypostigma,
cerebral excitement with hyperaemia
(especially cases of general paralysis of
the insane) can be removed or lessened
by the former, we can increase the blood
supply to an anaemic brain, as well
as excite action in exhausted nerve-
centres. The latter events the reverse
actions both on the cerebral equilibrium
and supply of blood.

2o. Jaborandi. This drug is probably
antagonized, but our knowledge is incomplete
Uses of Belladonna in Surgery—
The employment of Belladonna in surgery is chiefly confined to the Diseases of, and Operations on, the Eye; and its chief use here is owing to its property of dilating the Pupil. Drugs which have this action are termed "Mydriatics." The chief are:
Belladonna, Hyoscyamus, Stramonium, and Conium. The sulphate of Atropia is the most rapid and efficient mydriatic known. Its effects are produced by the Atropin, permeating the Cornea and coming into direct contact with the nerves of the Iris. This has been proved by tapping the anterior chamber of an eye under the influence of Atropin, and with the Aqueous dilating the pupil of another eye. Its action is mainly if not altogether due to its paralysing the 3rd nerve, or rather, the branches of it which supply the Iris, and thus producing complete
Relaxation of the Sphincter Papilla -

The drug when taken internally in small doses, for any length of time, or in one large dose, produces a similar effect, and so does the extract if rubbed around the eyelids. The local application of Atropin to the eye, however, produces these effects most rapidly and effectively. The Iris at times resembles a mere circular thread.

The effect of Atropin usually becomes decided in 15-20 min after application and often remains for 7 or 8 days.

Vision is not affected here, unless the patient be short-sighted, when it causes dimness. But where the dilatation has been induced by the drug taken internally, vision is much impaired, probably owing to Presbyopia - taking place from want of adjusting power of the eye, not to diminished sensibility of the retina.

As a topical application - the neutral
sulphate is preferred to the alkaloid for reasons already mentioned. We may as a rule employ a solution half the strength of the Leq Atrop Sulph P.P. Both in the treatment of diseases of the Eye, and as an adjunct to operations upon it, as well as an aid to diagnosis it is of the highest value. It has been well said that we could in the treatment of diseases, and injuries of the Eye better afford at the present time to dispense with all other drugs, lotions, and applications put together, than with this one topical medicament. Applied to an inflamed eye, it relieves local pain and spasm; it gives to the Eye, and its internal muscular apparatus, the Iris and Ciliary muscle, physiological rest; the best of all curative means. Besides in dilating the Pupil, it removes entirely two sources of danger; namely, closure of the Pupil by adherent Tumesce and adhesions.
See British Medical Journal April 27th 1872.
of the Iris to the lens. As a rule it is a perfectly safe application in ophthalmo- 
monic practice. According to Mr. 
Ernest Hart there is but one absolute 
contra indication, and that is the oval 
dilatation of the Iris met with in 
Glaucoma. There are of course also 
mechanical contra indications, as 
in certain penetrating wounds of 
the Cornea with protrusion of the 
Iris; where to dilate the Iris into in-
crease the protrusion yet even here 
when the Corneal wound is healed 
Atropin is required. 
The frequency and use of Atropin 
must vary according to the effects 
produced; for example where the Iris 
has become much inflamed before 
any local treatment is adopted, it 
is sometimes very hard to dilate. 
One or at most two applications a 
day are sufficient in Corneitis and 
in the milder cases of deeper treated
See Royal London Ophthalmic Hospital Reports, Vol. vii.

See Diseases of the Eye - Bledenell Carter.
inflamations: and after a time once in two or three days, as all then required is to keep the Pupil di-
lated, and the Ciliary apparatus at
rest. There are certain anomalous
effects, occasionally produced by
Atropin, thus frequent, or long con-
tinued application of it, will often
cause considerable conjunctival
irritation, and in rare cases it even
acts as a powerful irritant, giving
rise to symptoms of inflammation
of the Conjunctiva, or even of the lids.
These effects are probably due to some
idioquancy. Another result occa-
sionally met with, is spasm of the
Ciliary muscles, or even paralysis.
With regard to the mode of employing it
a drop of the solution (cap.97) may be
placed in the lower conjunctival fold,
next the outer canthus, 2 or 3 times
away, and according to Dr Carter there
is no better means of applying it than
by a goosequill cut to a blunt scoop. But considering the highly poisonous nature of the solution, he considers it safer to send it out in special bottles with a dropping apparatus attached, such as for instance as a little blown glass bottle with a narrow neck. We can partially fill this by first heating the bulb, so as to expel the air, partially and then inverting it and dipping its neck into the solution then in applying it, we invert the bottle, hold it in the warm hand, and touch the lining of the lower eyelid with its neck, from which a drop will issue.

When Atropin causes pain, the most probable explanation is, either that the drug is impure, or not neutral, or that Sulphuric Acid has been added to obtain a clear solution. In these cases we should at once procure a fresh supply. The best preparation of
Atropin however, when long used, may cause local irritation in some, and this is usually more manifest in the lower eyelid, and on the adjacent skin of the cheek, than elsewhere. There is a peculiar stiffness and dryness of the inflamed skin, and the tears flow over the cheek from swelling of the lower lid. The treatment is to discontinue the atropin, and apply soothing remedies to the closed lids, such as the Ung. Phenuti, Lubar (P.B.) or Ung. Simpkey with Lig. Apicis Lecith.

In the case of children and especially the children of the poor, atropin is often applied with great difficulty, and the solution is very apt to be washed away, or at least diluted with tears. It is often better, in these cases, to use the wafers of atropinised gelatine introduced by Mr. Heathfield. These for ordinary use are less suitable, as they often cause smarting, but for
See St Thomas' Hospital Reports 1873
crying children, they have an advantage in that they dissolve slowly, and are not liable to be washed away by tears. Kept as regards its use in Operations. In the operation for extraction of Cataract, it is generally recommended that the Pupil should be widely dilated with Atropin before its performance, and for some time after. Kept under its influence. According to Leitbrecht, previous dilatation of the pupil is not absolutely necessary, although desirable in these cases. Immediately after the escape of the Aqueous, the Pupil contracts. But still the previous dilatation is not without its effects, as without it the contraction would be much greater. By it also is determined the degree of dilatation obtainable for this according to Leitbrecht varies considerably especially in the old, even where the eyes are otherwise normal. According to Christie...
However, the instability of the iris is the same at all ages. After the operation, Liebreich considers its action both prophylactic and therapeutic. As regards the former, he considers it best as a rule to introduce the Atropin on the 2nd day, generally a single drop, and this is not to be repeated for long as the pupil remains dilated. But if in operating the remains of the Cornea are not completely removed we may apply a drop of Atropin immediately after the operation and again after the first 24 hours. Also if any unexpected irritation should arise Atropin must be freely used at once.

As regards the operation of discussion it is always necessary before operating to keep the Pupil widely dilated with Atropin. There are however certain difficulties in its use as too great intensity of the inflammation and
adhesions already completely organized, and these must be carefully considered before, as they may in certain cases contraindicate this operation, and compel us to extract. In Tridectomy no general rule can be laid down for its use. In the operation itself according to Liebreich there is neither an indication to apply it beforehand, nor after operating for prophylactic or therapeutic purposes. It is injurious in cases of Glaucoma and where there are total and completely fixed adhesions of the pupillary margin to the capsule or the corneal cicatrices. Small adhesions however, limited to one side of the Pupil; and which cannot be entirely included in the operation of Tridectomy may often be removed after operating by the free use of Atropine and sometimes also its produces an effect after Tridectomy which could not be obtained before: in such cases as
See *Diseases of the Eye* (2nd Edition), Lawson.
Hypopion. Correctis with consecutive rites, &c.

Next in Diseases of the eye &c. As an aid to diagnose it is often a valuable adjunct to other means, thus the degree of "latent" Hypermetropia can be ascertained by placing the eye under the influence of Atropin; (so as to paralyse the accommodation of the eye), and when the full effect has been gained by trying what convex glasses will enable the patient to see No. XX of Jaeger's test types at 20 feet, the focal power of the lens now required will give the degree of latent Hypermetropia.

Again, the somewhat rare affection known as "Spasm of the Ciliary muscle" may be detected by dropping in a solution of Atropin, so as to paralyse the ciliary muscle, and then testing the refraction with convex glasses.

In Vascular Illumination of the eye,
(which is one of our best means of examining the surface of the cornea and Iris, as well as the state of the Lens, where cataract is suspected) the Pupil is first dilated to the fullest extent with Atropin; a lamp is placed 5 ft from the Eye, and at the in front of it: a biconvex lens of 20 2½ inch focus is made to concentrate the light on the eye: then by moving it slightly, each part of the lens can be examined—

Rest in the treatment of diseases of the Iris — In mild cases of this disease, a proper use of Atropin alone, would (in the opinion of high authorities) be sufficient to effect a cure; while in severe cases, a perfect result could not be obtained without it whatever other treatment be employed. We may generally employ a lotion of the same strength as the Lig. Atropia Sulph. P. 1/3 of which one or two drops may be applied—
each time. As regards the frequency of application, the pupil should be fully dilated, as soon as possible in the disease, and this dilatation must be maintained during the course of the inflammation and for several weeks after it has ceased. To effect this, one application daily may be sufficient in some cases, while in others it may be required three or four times a day, or even oftener, and this may be required for several weeks. The use of atropin—however it is sometimes contra-indicated (see also p. 111)—in viree thus where there is great intensity of the inflammation, it is often not tolerated, it may even do harm. In such cases the inflammation must if possible be reduced by other means before applying it.

Again in most cases where some time has elapsed before the treatment was commenced, more or less adhesion
See Paper by Liebreich in St Thomas Hospital Reports 1873.
will be found between the pupil and the capsule. This adhesion will yield to Atropin, if applied early, and enough be used. But if some time has already elapsed, this separation cannot be made, and in such cases it should be at once discontinued, as it is certain to increase the inflammatory symptoms, by its action on the Iris.

Corneitis—Atropin acts here by diminishing the sensibility of the cornea, and relieving intra-ocular pressure and inflammation, by promoting the distension of the deep-seated vessels. As a rule one or two drops daily are enough in this disease, except where the permeability of the Cornea is diminished, or where there is intense injection of the deep-seated vessels, with a tendency to Ritis, also where the secretion of tears is profuse. In these cases it may be
Required to increase the quantity of 
Atropin (sometimes considerably) 
for a short time or at least until 
The Pupil is fully dilated. 
In the treatment of irritable Ulcers of the 
Cornea, and of Abrasions of the 
Epithelium in the Atropised. Cactus- 
Oil is the best application. We may 
use one 1-4 Atropin. to Al. Ricini 
3i. to which extent it is easily sol-
bile. Cactus oil by its viscid nature, 
tends to fill up the inequalities of 
surface, and diminishes the irritat-
ion caused by the movements of 
the lids, it is superior to gelatine 
or glycerine, which are easier washed 
off. The latter is often painful. 
In slaughtering Corneal ulcers, a 
Lotion made by dissolving 3i. of the 
extract, in 6i. of boiling water, and 
apply warm is a good application 
in superficial ulcers, we may apply 
a lotion of 3i. of the extract dissolved
in 3 oz. of water, three times a day

Scurfulous Ophthalmia—Belladonna may be given internally in this disease, as well as applied locally. We may give the tincture in repeated doses, combined if necessary with the mineral acids or tars, and bathe the eyes with a lotion similar to that last mentioned, or 2 or 3 drops of a lotion of Atropia S. (gr. i to 3;)

may be applied three or four times a day, or the Lin. Bellad. 3 P. may be rubbed into the brow, or an ointment of the extract and ammoniated mercury,

(gr. xx of the former, and xx of the latter, to the ounce of base) may be applied over the brow and temple during the day.

Chronic Ophthalmia—Belladonna is a good remedy here, especially in cases of "granular lids." Severe inflammatory symptoms are apt to occur here. A lotion of the extract may be
See Diseases of the Eye—Lawson (2nd Edition)
applied cold, frequently or continuously, either alone or combined with some astringent as tincture of alum. It will perhaps be sufficient to enumerate the other affections of the eye, in which Belladonna has been found serviceable. It is useful in catarhal opthalmia, in wounds (not penetrating) and other injuries of the cornea, a warm lotion is the best application. (3i extract to 0i water). In strabismus (or contraction due to functional causes) the gelatine discs of atropin may be used. In corneal opacities with or without haemorrhage into the anterior chamber, in sympathetic opthalmia, it action seems almost specific here attains in opthalmia before suppuration has set in, in the syphilitic form of choroiditis the extract, with mercurial ointment may be rubbed in over the eyebrow. The same treatment is
See Diseases of the Eye—Lawson (2nd Edition)
applied cold, frequently or continuously, either alone or combined with some astringent as Tincture of Album. It will perhaps be sufficient to enumerate the other affections of the eye, in which Belladonna has been found serviceable, it is useful in Catarrhal Opthalmia, in wounds (non-penetrating) and other injuries of the Cornea, a warm lotion is the best application, (3j extract to 0j water). In Injuries (or contraction due to functional causes) the Gelatine discs of Atropin may be used. In Cérdialysis with or without hemorrhage into the anterior chamber. In Sympathetic Opthalmia, its action seems almost specific here attunes in Opthalmia before suppuration has set in, in the syphilitic form of Choroiditis the extract with mercurial ointment may be rubbed in over the eyebrow - the same treatment is
Lee Salberg Wells on Diseases of the Eye.
also applicable in Pterostigious of the orbit. In injuries of the choroid coat which are usually followed by hemorrhage the atropin drops (gr1 to Zi) may be used twice a day which exerts a sedative influence and relaxes the pupil if there be any threatenings of inflammation.

In Blepharospasm (or spasmodic contraction of the Orbicularis) which is due to some irritation of the 5th nerve causing reflex contraction we may apply an Atropin lotion while the tincture is given internally in combination with tonics.

The hypodermic injection of atropin was recommended by Dr. Austic in painful Titis, Deep in threatening Glaucoma.

The above are some of the chief uses of Belladonna in diseases of the eye in many cases it is almost specific, and there are scarce any affection of the eye where it may not be used with advantage.
Uses of Belladonna in Medicine.
It has long been known as a remedy and applied at different times, in a variety of diseases. Thus it was once given in Amaurosis, and in Aneurisms; it was largely used as a substitute for Opium; to relieve the salivation of Mercuryism; also as a prophylactic against the same, as a diuretic to relax the abdomen in strangulated Hernia; to diminish the gripping of purgatives, &c.
At the present time it is chiefly used in the treatment of diseases affecting the Nervous System, also in various spasmodic affections, as in spasms of the different Sphincters, as of Worms, Bladder, Rectum, &c.
It should always be prescribed with caution, as severe toxic effects have occasionally followed its use in medicinal doses, and even its external application, as plaster, ointment.
Thus in patients taking it we sometimes meet with a erythematous rash with heat of the skin and febrile disturbance; these symptoms however quickly disappear on leaving off the drug; and ordering a light diet with plenty of diluents, some mild aperient; it should never be applied to abraded surfaces. Children as a rule are very tolerant of preparations of Belladonna.

In neuralgia, it is given internally here, as well as applied locally, in form of liniment, plaster, ointments, either alone or combined with other remedies. Wherever neuralgia is noted Belladonna applied to the affected parts will generally at least palliate the suffering. The subcutaneous injection of Atropin here has been attended with the best results, and it is as a rule perhaps best combined with morphia, thus we may use a solution of 1/2 dr. Atrop. S. and 1/2 dr. Morph. Act. in
See article in the "Practitioner". Vol I
two Dachmus Ag. diet. of which u TV - V may be injected at first.
According to Dr. Austee, mix of the tincture of atropine, is the proper
commencing dose for an adult, unless the pain is very severe, when a
somewhat larger quantity may be injected. It should be cautiously increased to 1/60 or 1/30 gr.
If more is seldom needed, and very uncomfortable poisonous effects may result if a larger quantity be
used. Most serious symptoms have occasionally been produced by 1/160 of atropine. The slighter symptoms of
atropine as dryness of the throat, vertigo, diplopia, are occasionally produced by doses three or
four times less than this. Their appearance shows that we have reached the limit beyond which it would not be safe to go.
Atropine, according to Dr. Austee is not a direct hypnotic, although it often
makes sleep possible, by relieving
severe pain, it is rather less frequently tolerated (in doses sufficient to relieve pain) than morphia. But it is an interesting and very valuable fact, that those who cannot bear one, will often bear the other, and even when both are tolerated we sometimes find morphia but more frequently atropin producing a permanent effect. It has been recommended to inject 150 gr. of atrop. S. in combination with each gr. 1/4 of morph. acet and this combination is superior to either alone for two reasons. 1. Atropin diminishes the tendency of morphia alone to cause nausea, which is a common result of using it separately. 2. Greater analgetic effects are obtained than either alone would produce, if more atropin be used we may have symptoms of atropism, as slight delirium, or rapid action.
of the heart. These may be relieved by increasing the proportion of morphia. Cases however are frequently met with where the suffering is aggravated by opium in any form.

In all such cases, no remedy is so good as a combination of atropine and arsenic used hypodermically. Atropine and Quinine may also be used thus, In severe cases these remedies have been employed with benefit, while the patient was under the influence of some anaesthetic as chloroform or ether.

In Epilepsy, it has been recommended by various writers, and has been given with advantage, where other remedies have failed. It is better by far to use on than other remedies, especially the bromide of potassium. Its action is apparently slower, and also much more uncertain than this, and even M. Fourneau who advocated its
See Diseases of Children. D. West.
we could advance no more in its favor, than that "he had been less unsuccessful with it than with any other remedy." - O'Connell describes one case, where epileptic seizures of the most marked character, and of daily recurrence, in a boy aged 9 years, ceased under its use, when they had been entirely uninfluenced by the bromide of potassium; and he also saw the frequency of the return of fits diminished under its steady and long continued use. It should be given in small doses for months together, say 9 or 14 of the extract, or mj of the Liquor Atropiae, twice a day. Rousseau said "Give Belladonna continuously for one, two, or more years" in this way only, are its good effects obtainable. He recommends this mode with small doses long continued especially in epileptic vertigo.
In Cancer—Belladonna has long been employed as a remedy in cancerous affections. It was formerly given internally in Schirrood and tumors as a sedative, while the leaves were applied in form of poultice externally.

As an anodyne and sedative to relieve the severe pain of cancerous diseases, it is one of the best remedies, and it may often be advantageously combined with opium, comfrey, in form of suppository, or as an internal remedy. As an anodyne it is however inferior to opium in this disease. A combination of morphia and atropine is of the highest value for subcutaneous injection; as before stated, greater anodyne effects are obtainable, and we avoid the tendency to constipation, sickness, or head symptoms, which usually
Lee S. Farmes Practice of Medicine, 6th Edit.
attend on the administration of Opium alone. A combination of Atropin and Aconite will often be found of benefit in this painful affection also, administered in the same manner.

In Cancer of the Liver especially, we should use Belladonna with or without Conium. Opium does not act well here, also in that of the Rectum to check the growth and spread of Cancerous growths, Belladonna (and Acetic acid) has been strongly recommended among others by Dr. Jenner. He advised its use in moderate doses continued for several months, while at the same time full doses of Acetic acid were administered. He also recommended this treatment for a long time after the removal of Cancaers by operations. This combination seems to have some effect in moderating abnormal
See Philadelphia Medical Journal May 1872

See Handbooks of Therapeutics - Ringer

See Lancet July 25th 1874 - article by Dr. Williamson
cell growth. Additional experience however is wanting of its effects.

Drugs may be combined with it if necessary.

In Phthisis—Of late years Belladonna has been introduced as a remedy in phthisical sweating and in many cases it is of undoubted service.

It was first proposed in 1872 by O. Welsch of Philadelphia, and Mantzel of Berlin in 1873 published an account of its uses in this respect. It has been since recommended by Sidney Binger & others. The sulphate of atropin is commonly employed in the form of pills with extract of Gentian or Pyrethrum. We should begin with small doses say

grs 1/90 and if necessary the dose may be increased to 1-50 gr. but this quantity should not be exceeded.

Of 16 cases in which it was tried in the Hospital for Consumption, Ventnor, in each the first dose produced a distinct
effect on the sweatings, either wholly
arresting, or materially diminishing
them. In 1/4 of the cases only was
this effect permanent, so that the reme-
dey could be omitted, without a return
of the sweating, and each of these after
two months reported that he was still
free from the slightest perspiration.
Of the remaining 12, I found the ben-
efit direct but temporary, that is they
obtained complete relief on those
nights only, on which they took
the atropia. In 7 cases although
gri/80 diminished the sweating at
first, still to maintain this effect the
dose had to be increased, and the
toxic symptoms at last became so
marked, that the remedy had to be
discontinued in the whole 7, without
its effecting a cure in any of them
and in 1 case though it relieved the
sweating in gri/80. doses, it caused such
severe toxic symptoms, that it had to be
See British Medical Journal Nov. 2. 1874
abandoned. It is to be noted that in many of these cases the sweating had lasted for several weeks, and had resisted the ordinary methods of treatment. The chief toxic effects produced were: intense heat and dryness of the throat at night, and indisposition for bodily or mental effort next morning. Vomiting sometimes occurred, diarrhea was not observed. In one case there was retention of urine for several hours. The pupil was generally sluggish, but distinct dilatation was uncommon (except when gr. 1/60 doses were given). They often complained of dizziness, and inability to read any print but large type. Of three cases treated in the Belford Hospital with Dr. Bellad, the 1st it was given in doses of mix ter die increased to mix ter die, in 5 days the perspiration was checked. In the 2nd case mix at bedtime, increased to xx
050

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after the 2nd day, checked the sweats in 5 days, in the 3rd case one draught of wine checked the perspirations at once. Hooping Cough. According to several authorities, Belladonna of all other remedies seems to exercise the most constant and potent control over the paroxysms. It was recommended by Dr. Fuller in small increasing doses combined with sulphate of zinc. Thus to a child aged 3 yrs he gave gr. 1/4, Eqt. Bellad. with gr. 1/4 zinc Sulph. four times a day, and increased the dose by gr. 1/8th of the extract and gr. 1/2 of the sulphate. The dose of Belladonna may it is said be thus increased to gr. without any mischief. M. Trouseau recommended a single large dose once a day, or once in two days. It has been recommended to be given as the powdered leaf, say gr. 1/4, 2 or 3 times a day for a child of 1 year, and cautiously increase till we reach a dose
See Diseases of the Lungs. Walshe 1st Ed.
which exercises an influence over the parasympathetic.
According to Dr. Walpole this remedy may require to be pushed to the limits of poisonous doses before producing its therapeutic effect. It is undoubted success in many cases, but sometimes fails, and besides is not devoid of danger. The Linn. Bellad. B.P. alone or combined with other remedies as camphor, and chloroform, may be rubbed along the spine, or strips of the belladonna plaster may be applied in the same situation.

Asthma — In this distressing complaint Belladonna is a remedy which often affords great relief. It rarely fails to relieve the bronchial spasm and in mild cases where this is the only element, it may be sufficient to effect a cure. The extract may be given, in doses of 7x 1/4 - 1/2 every
3-4-6 hours, while the tendency to spasm lasts. The dryness of the throat, which it sometimes causes, may be relieved by frequently sipping soothing tea, or barley water. The tincture has been also recommended alone, or with other remedies, as either ammonia, oxide of potash, or

in severe paroxysms the subcutaneous injection of Atropine either alone or with morphia, is often of great benefit. Many be required while the patient is under the influence of anaesthetics.

In Heart Diseases—Belladonna is a valuable remedy in various affections of this organ, whether functional or organic. Its internal administration may be combined with other sedatives and tonics while a belladonna plaster is applied over the cardiac region. This treatment is often of great value in cases of hypertrophy, valvular
Lee Practice of Medicine  Tanner  6th Ed.
diseases, or even simple functional
derangement of the heart. It
tends to diminish undue excitement
and acting both as a stimulant,
and sedative, it often improves the
strength, and regularity of the
heart's action.

Angina Pectoris. It is a valuable
remedy in the paroxysms of this
disease. The tinct. Bellad. combined
with Chloroform may be applied
locally on Epongio-Plastr. During the
intervals a belladonna plaster may
be applied over the precordium,
internally the tincture may be
given alone or with other remedies
Thus—Gr. Sp. with Sulph Co. Ziz
Sp. Ammoniac. Arom. 3 d 8
T. Bellad. 3 f
T. Cantharides 2 f 3 f
T. Chloroformi 3 f 3 f
Ag. Camphorae ad Zviii 14
S. 3 f every half hour while in pain
A somewhat similar treatment, is applicable in most painful intrathoracic tumors.

Chronic Rheumatism. As a local remedy here it is perhaps the best application. in lumbar, pleurodynia, we may apply the Lin. Belladonna pungs pili, &c. with great benefit, or the Euphacterium may be used, but this is much slower and less effectual in its action.

The tincture or extract, may also be given internally, for the relief of pain, and it will often be found of service to combine Quinine with it. As an anaodyne it has the advantage over Opium, of not constipating the bowels, or disordering digestion.

The subcutaneous injection of Atropine also has been had recourse to with good results, both alone and in combination with Arsenite or Intussusception. It is probably an
inferior remedy here to Opium.

As a sedative it may begin internally when the pain is not very acute, in severe cases we may inject Atropin subcutaneously, while the Extract is rubbed over the bowels.

In intestinal colic, as an anodyne and antispasmodic, it is probably a better remedy than Opium. In animals poisoned by Belladonna the esophagus has been found as irritable as ever, but in those poisoned by Opium, the contractility of the alimentary canal is much impaired.

In many disorders of the Genito-Urinary organs Belladonna will be found of great benefit. A special use of it is in Spermatorrhoea. It was recommended in nocturnal spermatorrhoea by Trousseau and others. It should be given as the Extract, in form of pill. It may also be combined with
See Diseases of Children. West. 6th Edit.
other remedies as Camphor.

In nocturnal incontinence of urine as it occurs in children, Belladonna is of great service, according to Dr. West it is most useful in those cases where the incontinence of urine was quite a chronic evil, and not associated with any manifest constitutional disorder. He recommends it to be given in gradually increasing doses, four times in 24 hours, and it may be required in very large doses, before it exhibits its specific influence on the disorder, and this without the production of any of its poisonous effects.

In spasm of the Bladder, it may be combined with Opium, and Ether, as a draught, or with the former as a suppository.

Finally, Belladonna or atropin is the best of all remedies for every kind of pain in the pelvic viscera. There
is no other medicinal remedy like it in this respect.
The above are some of the principal
diseases in which Belladonna
has been of much value, but there
are other affections, in which it has
been recommended. Thus in
Typhoid Fever, it is often a very
useful anodyne, its stimulant
and sedative effect on the nervous
system make its use often indicated, where
opiates would be inapplicable.
Indeed there are many diseases
where we cannot give Opium alone
where opium and Belladonna answer well.
In Chorea, it sometimes does good,
especially in that form of it which
occurs in the adult, the subcutane-
ous injection of Atropin may be used.
In Paraplegia—where the symptoms
point to irritation or congestion of
the Spinal cord, it is often of benefit.
Strong Solution internally, while the
Extract combined with other remedies as mercury, or iodide of potassium, or simply dissolved in glycerine, may be rubbed along the spine; or a large belladonna plaster may be applied.

In tetanus the extract may be rubbed along the spine, and also given internally, in doses of 9 grains, every 3 or 4 hours. Combined with laudanum it seems to have some effect in relieving the severity of the convulsions.

In hydrophobia it has failed to be of permanent benefit, the subcutaneous injection of atropine may be tried.

In exophthalmic goitre it has been employed with success, where other remedies failed. Dr. R. Smith describes two cases successfully treated by 1/4 of the tincture every hour. The first was restored to ease and comfort in a fortnight though the exophthalmus was much longer in disappearing.
the 2nd cure was effected in a month although for 3 months previously the had been treated with cinch, digitalis, valerian, acouite, iodine internally, ice locally and the constant current, without deriving any benefit.

In Spasmodic closure of the Pinea Clotidia, which is due to reflex spasm, Belladonna is often of service either alone or with other remedies, as bromide of potassium, or ammonium, or sulphate of zinc.

Biliary Colic. It may be used here either given by the mouth or rectum, or internally. It is a good remedy in this affection.

In various painful diseases of the Rectum as stricture, or simple neuralgia, fissure of the anus, or irritable sphincter, it may be used in form of suppository, or combined with other remedies as mercury in.
In Midwifery and Diseases of Women, Belladonna is a remedy of great value. As an anodyne for the relief of pain there is no other medicinal agent equal to it. As a pessary with wax, balsam, or especially Cacao Butter, it often affords the greatest relief in painful affections of the Genito-urinary organs. This mode of applying remedies which seems to have been of very ancient introduction, has fallen into disuse until revived by the late Sir James Simpson of Edinburgh. The Resin of Atropa should contain gr. 1/20, those of the Eyth Belladgrij by the sympathetic vomiting of Pregnancy the Lin. Bellad. applied over the pit of the Stomach often gives relief, or an ointment of gr. 1/2 of the Eyth mixed with gr. 1/2 of Lard may be rubbed on frequently as recommended by M. Bretonneau. The troublesome salivation which
See Manual of Midwifery, Churchill
sometimes occurs during pregnancy, is best treated by small doses of the tincture, while the extract may be applied over the swollen, painful glands. Belladonna has been recommended by Chaucer as a local application to the cervix uteri, in spasm of the C6 during labour, when from any cause speedy delivery is important. According to Churchill its efficacy, however, is doubtful, and its toxic effects might prove injurious in checking the secretion of milk after delivery. When from any cause it becomes desirable to do so, Belladonna seems almost specific in its action. The extract (dissolved in an equal quantity of Glycerine) may be rubbed into the breast, every night, around the areola, or the Euplastrum cut into a circular shape may be applied over the breasts. While the tincture may be given internally.
See Diseases of Women—Dr. Barnes
alone or combined with iodide of potassium, quinine, camphor, etc. It was recommended in the consolidation of pregnancy by Dr. Barnes he gives the extract in gr. 1/4-1/2 doses in very minute pills, every two hours, until its topical action is declared. Ointment may be injected subcucutaneously either alone or with a little morphine, gr. 1/30 is enough for one injection.

In all painful affections of the female generative organs, Belladonna alone or combined with other anodynes is of the highest value. It acts as an anodyne without causing constipation or derangement of the digestive organs and it also tends to relieve the sickness which is so common in these disorders. By its stimulant action on the spinal cord and sympathetic, (though in which latter these organs are mainly supplied) it diminishes
the tendency of other organs to become
affected consequentely, and it also
relieves the wearying backache so
frequently conjointed
in sympathetic pains wherever they
may occur, in Cramp, whether occ-
curring before, or during labor, it is one
of our best antiseptics; in purities
of the vulva as an ointment with
coldcream (3i to 3i); it is a good
application; in Phlegmatic Dolence
as a warm fomentation it is useful
in simple irritability of the uterus; a
pessary may be introduced while the
plaster is applied to the abdomen
it may be advantageously combined
with lead (in form of pessary) also
where required, or with potassae per-
manganatis if these fator of discharge
or with mercurial ointment etc.
There are few painful diseases peculiar
to women where it may not be of
benefit, though it must be used with caution
As a prophylactic against scarletina, in conclusion it remains only to say a few words as to the alleged prophylactic properties of Belladonna against scarletina. It was stated to cause an eruptive disease, with which scarletina is incompatible. This curious and irrational idea, which was first announced by Hahnemann at one time gained favor in Germany and elsewhere, even among those who placed no credence in the groundless doctrines of Homeopathy. Thus it was said that at Langendorf in 1825, when two children were attacked who slept in the poorhouse of the town, 186 others who took Belladonna escaped among whom were two who slept in the same room with the sick, and that out of 12 children who took the remedy escaped during an epidemic which attacked 206 others with whom they lived, and who were unprotected, Oppenheim
is said to have given it to 1200 soldiers and only 12 of them took it. Boyle collected 2027 cases where it was taken, but who were exposed to infection, 1948 escaped. On the other hand there were some notable failures. Dr. Legismand gave it to 11 persons, yet all took the disease. In this country the results of experience have not been in its favor; it has several times been tried in large public institutions, without any marked benefit resulting from its use. Sufficient is it to say in concluding that at the present time Belladonna is considered entirely useless, as a prophylactic against the poison of Scurvy.