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Original and Selected Papers.

THE PHARMACY OF THE BIBLE.*

BY J. T. SLUGG., F.R.A.S.

I use the word pharmacy in its literal and broadest, not in its conventional and narrow sense. It cannot be otherwise than interesting to gather together and pass in review the teachings of the Bible, whose history goes back four thousand years into the past ages, as to matters connected with our own daily calling. After a careful investigation of the subject, I am bound to acknowledge at the outset, that whilst on the one hand there are references to many of the diseases which have afflicted mankind in ancient times, there is very little to be learnt in the Bible as to the nature of the remedies employed, or the healing art in general. We read of physicians and of apothecaries, and of the "many medicines of the Egyptians;" and Solomon, who wrote, we are told, on natural history, seems to have included in his favorite study some knowledge of the medicinal use of various plants, etc., but the results of his study are lost to the world. The drug known as the "balm of Gilead" was supposed to have a medicinal virtue. We meet with what is a very popular remedy in the present day, prescribed by the prophet for a boil of a very serious nature, from which King Hèzekiah was suffering, viz., a plaster of *figs*, which was successful in its results. We learn something of what we may call a domestic

* Read at a meeting of the Manchester Chemists' and Druggists' Association, March 8, 1872, and published in the Chemist and Druggist, April, 1872.

remedy for a wound, in the time of the Saviour, in the parable of the good Samaritan, who, finding the wounded man, bound up his wound, pouring in *oil* and *wine*. Though *poisons* are frequently mentioned in the Bible, there is no *direct* reference to vegetable or mineral poisons as a means of destroying life; those mentioned being the poisons of animals, as of serpents, asps, and dragons. In the list of the evil practices of the day given by St. Paul in his Epistle to the Galatians, occurs the word "witchcraft." The Greek word for this is "*pharmakeia*," from which our word pharmacy is derived. It has been suggested that *poisoning* is meant. No doubt it does either mean that, or what is more probable, the preparation of magical potions, and what were then believed in, and greatly used, *philtres*. We read of *eye-salve* in Revelation, but have no means of ascertaining of what the eye-salve then in use was composed. It is worthy of note, that there is an occasional trace of chemical knowledge in the earliest times; for instance, the calcination of gold by Moses; the action of vinegar on natron, and of the cleansing properties of *soap*. We find also a direct reference to the business of a druggist, though not by name, in the Song of Solomon, where, in connection with perfumes, we read of "the powders of the merchant." In Exodus (xxx. 23) we have a regular Hebrew prescription, commencing with the orthodox, "Take of so and so, so much."

In the Bible we have either direct or probable reference to forty-five drugs, viz:—

Aloes.	Fig.	Natron.
Aniseed.	Garlick.	Olive oil.
Almonds.	Gall.	Onycha.
Antimon sulph.	Galbanum.	Palm.
Balm of Gilead.	Honey.	Pomegranate.
Brimstone.	Hyssop.	Ricinus.
Bdellium.	Hemlock.	Saffron.
Calamus.	Lign Aloe.	Sponge.
Camphire.	Lime.	Stacte.
Cassia.	Mallows.	Spikenard.
Cummin.	Manna.	Soap.
Coriander.	Millet.	Vermilion.
Colocynth.	Mint.	Vinegar.
Cinnamon.	Mustard seed.	Wax.
Frankincense.	Myrrh.	Wormwood.

Besides these, we read of anointing oil, ointment, perfumery, plaster, mortars and pestles, scales and weights.

Mortars and pestles we meet with as early as the time of Moses, for we learn that the Israelites in the wilderness used them for the purpose of grinding or beating the manna which they gathered. In Proverbs we find it suggested, "Though thou bray the fool in the

mortar with a pestle, yet will not his folly depart from him." Egyptian sculptures exist exhibiting the figures of men pounding in mortars with large pestles. On the wall is a sketch of one such Egyptian piece of sculpture. On the left you see two men standing opposite each other at one mortar, each with a large pestle, pounding alternately, as we often see blacksmiths striking their iron. On the right of the sketch is represented one man sifting the contents of the mortar, whilst the other is bringing a fresh supply. Next to this sketch you see one of another piece of sculpture, exhibiting the ancient form of scales used by that people. As scales of this form appear in the paintings and sculptures of the Egyptians as ancient as the time of Moses, we may conclude that the scales used by the Jews were of similar construction, and it is interesting to notice that they so greatly resemble the hand-scales in use among ourselves.

Ointments are frequently mentioned in the Bible, showing their use in very early times. There is a reference in the Book of Job, which is perhaps the most ancient book in the world, to the process of making ointment; where we read, "He maketh the sea to boil like a pot; he maketh the sea like a pot of ointment." There is also a remarkable reference to ointment in Ecclesiastes, indicating that the apothecary of that day was as troubled with flies in his business as the druggist of to-day, for they got into his ointments and spoiled them. "Dead flies cause the ointment of the apothecary to send forth a stinking savor." The ointments in use amongst the Jews were to a great extent vehicles for perfume; hence the words in the Song of Solomon, "Because of the savor of thy good ointment, thy name is as good ointment poured forth." Amongst the Jews the use of ointments was four-fold, viz., for cosmetic, funereal, medicinal, and ritual or religious purposes. The practice of anointing the head and clothes on festive occasions prevailed among the Jews. There are several references to it in Scripture. Ointments were also used to anoint dead bodies, and the clothes in which they were wrapt. This explains our Savior's saying, "Against the day of my burying hath she done this." In Exodus, Moses is commanded to make a holy ointment to be used only for sacred purposes, compounded of myrrh, sweet cinnamon, sweet calamus, cassia and olive oil. Of the dry ingredients, 60 lbs. were to be used to 12½ lbs. of olive oil. It is difficult to understand how so little oil could form the other ingredients into an ointment. Maimonides says that the powdered ingredients were infused in water till all the virtue was extracted, and then the infusion poured into the oil and boiled till the water was evaporated. The ointment was to be "compounded after the art of the apothecary." In the margin we have the word "perfumer" for "apothecary," which is a better rendering of the word. The business of a perfumer was not distinguished from that of an apothecary in the time of the translators. Hence Shakespeare, who lived long before, says, "An ounce of

civet, good apothecary, to sweeten my imagination." Whether the Jews in Bible times understood the nature and use of drugs as medicinal agents or not, they certainly understood the art of perfumery. We have ample evidence of their profuse employment of perfumes. They used them to their persons, their clothes, and their beds. Even as early as the time of the patriarch Isaac, before the Israelites went into Egypt, we have an instance of perfumery applied to the clothes. We are told that the old man said to Jacob, "Come near now and kiss me, my son;" and he smelled the smell of his raiment, and said, "See, the smell of my son is as the smell of the field which the Lord hath blessed." The principal fragrant substances employed in perfumery by the Jews, were cassia, cinnamon, calamus, camphire, frankincense, lign aloe, myrrh, saffron, spikenard. These articles were used either dry, or their perfume extracted and embodied in the form of an ointment.

Cassia and *Cinnamon* are no doubt the barks of trees known by those names at the present day. Cinnamon is mentioned, as we have seen, by Moses, which is of importance as throwing considerable light on the fact that even in the earliest times the products of one country found their way by means of foreign trade into distant lands. Cinnamon was not grown nearer to Egypt than India and Ceylon, and the question arises how this product of the far East found its way thus early into the neighborhood of the Mediterranean? Dr. Kitto thought that this was effected by the Arabians.

Calamus is generally supposed to be the *Calamus aromaticus*, or sweet flag; but this is denied by some scholars, who refer it to the lemon-grass of India and Arabia.

Camphire is an incorrect rendering of the word *copher*. In both the places of its mention the marginal reading is "cypress." The substance really denoted is the *henna* plant, or *Lawsonia alba*. It was used as a dye for the nails, giving them a deep yellow or orange tinge, which was greatly admired.

Frankincense.—The ephithet frank or free was applied to incense because of the freeness with which it gives out its odors and burns. It is not the article known as gum *thus*, but that known as olibanum, a gum produced by a tree known as *Boswellia serrata*, or *B. thurifera*. It was imported we learn from Jeremiah, from Arabia.

Lign aloe is the eagle wood of India, and has no connection with the drug known as aloes, the name being a corruption of the Arabic *allowat*. Of all perfumes this was most highly prized by Eastern nations; the Jews believed it grew in the garden of Eden.

Myrrh is mentioned in our English Bibles as a part of the present sent by Jacob to Joseph, and also as one of the spices which the Ishmaelite merchants were carrying into Egypt. The original word here is *Lot;* whereas the word which is rendered "myrrh" in every other part of Scripture is *mor*. The article called lôt was not

myrrh, but most probably gum labdanum; inasmuch as myrrh was not produced in Palestine, as the passages in Genesis speak of it as being exported from Gilead into Egypt. It was among the gifts brought by the wise men to the infant Jesus, and was highly valued by the Jews and other ancient nations. We are told that before Esther was presented to the King, "she was purified six months with oil of myrrh, and six months with sweet odors."

According to St. Mark, just before our Savior's crucifixion, the soldiers offered a draught of "wine mingled with myrrh." It is difficult to understand this passage. Commentators agree in assigning as a reason that it was intended as a "pain-killer, presented out of pity." But myrrh is not an anodyne. The other evangelists speak of the draught as "vinegar mixed with gall." As *gall* stands associated in other places with that which is poisonous, the probability is that the draught contained some bitter and anodyne herb; it may have been the poppy, intended to stupefy the sufferer.

Saffron, there is no doubt, is the correct rendering of the Hebrew word. From the earliest times it has been in high repute as a perfume. It was used, we are informed, for the same purpose as modern "pot pourri."

Spikenard—We read that "Mary took a pound of ointment of spikenard, very costly, and anointed the feet of Jesus." One of the disciples was displeased with so lavish an expenditure, asking, "Why was not this ointment sold for 300 pence and given to the poor?" It appears from this that its value was £9 7s. 6d. There is much difference of opinion as to what really the plant was which was rendered "spikenard." Sir William Jones, one of the most learned Oriental scholars, said of this famous perfume, "I am not of opinion that the nardum of the Romans was merely the essential oil of the plant, but am strongly inclined to believe that it was a generic word, meaning what we now call attar or otto of some plant; or the mixed perfume called "abir," of which the principal ingredients were yellow sandal, violets, orange flowers, wood of aloes, rose, musk, and true spikenard." The true spikenard, the "nardus indica," was highly esteemed as a perfume and as a stimulant medicine.

By *Aloes* we are, of course, not to understand the medical drug of that name, but either the Lign aloes or, what is quite probable, some kind of odoriferous cedar.

Aniseed is mentioned in connection with *mint* and *cummin*, which are represented as three of the smallest and most insignificant plants. No doubt mint and cummin are rightly translated, but the world translated *anise* Dr. Royle thinks should be called *dill*, as the anethum is more specially a genus of Eastern cultivation than the other plant. There is also an allusion to cummin in Isaiah, where the mode of separating the seeds from the plant is mentioned

as being accomplished, not with a cart wheel turned on them, but by being beaten with a rod. Which of the *mints* is referred to I am unable to say. The ancient Greeks employed an herb which they called *menthos*, also termed "eduosmon," or the sweet-smelling herb. This is thought to be the "pipertia."

The *Almond*-tree, being a native of Asia, was well known to the Jews. "Luz," translated *hazel* in Genesis, was another word for almond, and should have been so rendered.

Sulphuret of Antimony was known in most ancient times as a black pigment, and was used by both Greek and Asiatic ladies as a paint for their eyebrows. Mr. Rimmel, in his admirable "Book of Perfumes," says, "Jewish women were mostly adorned with great physical beauty. Not content, however, with their natural personal attractions, they tried to enhance them with various cosmetiques." They were addicted to the practice of "painting" quite as much as the ladies of our own day. We are told that when Jezebel expected Jehu "she painted her face." Mr. Rimmel and Pereira both think it was her eyes to which she gave that dark hue, which was thought so fascinating, Ezekiel refers more directly to this practice in the words, "Thou didst wash thyself, paintedst thine eyes, and deckedst thyself with ornaments." Pereira informs us it was the sulphuret of antimony that was thus used.

Balm of Gilead was supposed to have a medicinal virtue, to which there is direct reference in the question asked by the prophet Jeremiah, "Is there no balm in Gilead? Is there no physician there? Why, then, is not the health of the daughter of my people healed?" In another place it is said, "Take balm for her pain; if so be, she may be healed." And again, "Go into Gilead, and take balm; in vain shalt thou use many medicines, for thou shalt not be cured." It was an article of commerce at a very early period; for we read that the company of Ishmaelites to whom Joseph was sold by his brethren came from Gilead with their camels, bearing spicery and balm and myrrh, to carry it down to Egypt." We learn the value placed upon it from the fact that when Jacob sent his sons the second time to the ruler of Egypt, desiring to propitiate him, he bade them "take a present, a little balm, a little honey," etc. Pliny says, "To all other odours whatever, the balsam is preferred." It was esteemed so precious a rarity that both Pompey and Titus carried a specimen to Rome in triumph. "A small piece of the resin," says Theophrastus, "was so odoriferous, that it filled a large space with its perfume." He adds, that in his time only two enclosures of small extent were known to produce this tree. It was obtained from the *Balsamodendron Gileadense*, or *opobalsamum*. Pereira says it is whitish, turbid, thick, very odorous liquid, which resinifies and becomes yellow by keeping. Its physiological effects are believed to be similar to balsam copaiba and the liquid turpentines. The most wonderful properties were formerly ascribed to it.

It is rarely employed by Europeans, but it is adapted to the same cases as the terebinthinates.

By *Brimstone*, no doubt is intended the substance known to us under the same name.

Bdellium is named in the Bible as early as the second chapter of Genesis, where it is associated with gold and onyx stone as one of the productions of the land of Havilah. In Numbers, the color of manna is likened to *bdellium:* but it is very doubtful if the word translated *bdellium* be a mineral or animal production, or a vegetable exudation. There is a kind of myrrh, the product of the *Amyris commifera*, known as Indian *bdellium*, which is very odoriferous, diffusing a grateful fragrance to a considerable distance. Whether this be the same article or not is uncertain.

Coriander seeds are, no doubt, the same as now pass under that name. They are only mentioned twice in the Bible.

The *Colocynth* plant is referred to, though not by its name, but is called the "wild vine." In the Book of Kings we are told that some of this plant was gathered and used by mistake as a potherb, being shred into a pot of pottage of which the sons of the prophets partook.

Figs.—The trees bearing this fruit are very common in Palestine. There are many interesting references to them in Scripture.

Garlick is mentioned once in Numbers, in connection with fish, cucumbers, leeks, melons, and onions, as the food of the Israelites in Egypt, after which they longed when feeding on manna in the desert.

Gall, Hemlock and Wormwood.—There is occasional reference to wormwood in the Bible, which is always metaphorical as indicating that which is bitter, and, in this sense, it is sometimes associated with *gall:* as, for instance, "lest there should be among you a root that beareth wormwood and gall." *Hemlock* occurs twice in the Old Testament, but the Hebrew *rôsh*, which in these two places is rendered hemlock, is elsewhere translated "gall," denoting anything bitter. Whether hemlock is the best rendering of *rôsh* is doubtful. The Hebrew word means *head;* and it is more probable that, as Gesenius supposes, the capsules of the poppy are intended.

The *Galbanum* of the Bible, Bishop Patrick tells us, must not be confounded with the common galbanum used in medicine, but that it was a superior sort found on Mount Amonus, in Syria.

Honey is another article of pharmacy often mentioned in Scripture. It abounded in Palestine. The word translated *honey* also applies to a decoction of the juice of the grape, which forms an article of commerce in the East. It was this, and not bee-honey, that Jacob sent to Joseph. A third kind of honey has been described by some writers as vegetable-honey, by which is meant the exudations of certain trees. There is a fourth kind mentioned by Josephus, produced from the juice of the date.

Hyssop.—Perhaps no plant mentioned in the Bible has given rise to greater difference of opinion than this. Bochart thinks that marjoram, or some plant like it, is indicated. Dr. Royle arrived at the conclusion that it is no other than the caper plant.

Lime and the mode of obtaining it by burning the carbonate were known in the most remote periods of antiquity. It was used by Hippocrates in medicine. It is mentioned only three times in the Bible, in one instance being translated plaister, showing it was used then as now, for cementing stones, etc. There is a still more curious reference to it in Amos, where we read, "Because he burned the bones of the Kings of Edom into lime." This expression indicates a knowledge of chemistry as to the constitution of bones 800 years B. C.

By *Mallow*, no doubt is meant "purslane," which was used as a potherb.

The *Manna* of the Bible is certainly not the same as the manna of our shops, and has no relation to it.

Millet is probably a correct translation; and by it is meant the *Sorgum vulgare*, used in the time of Ezekiel, and at the present day in many countries of Europe, for making an inferior bread.

Mustard seed.—The tree named in the New Testament has been the subject of much dispute. Great difficulty has been experienced in fixing on a tree on whose "branches the birds can lodge." The *Salvadora persica*, however, answers this description.

Natron and *Soap.*—The word "*nether*" translated *nit. e*, undoubtedly means *natron*. The substance denoted cannot be our *nitrate of potash*. In Proverbs, the incongruity of singing songs to a heavy heart is compared with the reaction which takes place when vinegar is applied to natron. In Jeremiah we have the same word again wrongly translated. "Though thou wash thee with nitre and take thee much *sope*," etc.; evidently natron is intended. The word *bôrith*, translated "soap," is a general term for any substance of cleansing qualities. We may understand the natron to represent a mineral alkali, and soap a vegetable one, probably some kind of potash. Numerous plants, capable of yielding alkali, exist in Palestine and the surrounding district.

Olive Oil.—This is one of the oldest drugs known. Jacob consecrated the stone pillar which he set up by pouring oil on its top. It was produced in large quantities in Palestine, and was exported thence into Egypt and other countries.—King Solomon giving 170,000 gallons yearly to the Tyrian hewers of wood. It was used in religious services, in making perfumed ointments, as an article of food and medicinally. Celsus frequently speaks of the use of oil, especially old oil, applied externally, with friction, in fevers, and in other cases. Josephus tells us that amongst the remedies employed

in the case of Herod, who "was eaten up of worms," he was put into a bath of olive oil.

Onycha has been supposed by some to have been the gum of a tree. It is now, however, generally believed that it was the shell of a species of mussel, found on the shores of the Red Sea, which, when burnt, emits a smell not unlike that of musk.

Palm.—Although this tree was so well known by the Jews, and its products are so numerous, excepting its syrup called honey, there is no clear allusion to any of them in the Bible.

The word *Pomegranate* is derived from "*pomum granatum*," "grained apple." The beauty of its flowers has furnished Solomon with several allusions. The estimation in which it was held by the Israelites may be inferred from its being specified as one of the luxuries they enjoyed in Egypt. It was one of three kinds of fruit brought by the spies from Eschol.

Ricinus, the castor-oil plant, was known in very early times. Some of its seeds have been found in Egyptian sarcophagi supposed to have been 4,000 years old. This is the plant which, in the book of Jonah, our translators have rendered *gourd*, and which we are told "was prepared by the Lord to come up over Jonah, that it might be a shadow over his head."

Sponge is only mentioned in the New Testament—in connection with the crucifixion. The commercial value of it was known, however, from the earliest times.

The word *Stacte* signifies an odorous distillation from some plant. It was probably the gum of the storax-tree.

Vermilion is mentioned twice in the Old Testament. The original word means simply "redness," and may refer to any kind of red paint. Cinnabar, however, has been found in the colouring-matter of the old Egyptian tombs.

Vinegar is mentioned by Moses 1,490 years B.C. By this term is sometimes meant the common sour wine of the country,—the ordinary beverage of the people; at others it indicates a liquid made from grapes, which had undergone the acetous fermentation.

Wax.—Honey having been so abundant in Judea, we naturally concluded that wax also would be known. There are a few allusions to it in the Old Testament showing its properties to have been well understood. The Psalmist speaks of his heart as being "melted like wax."

THE MICROSCOPE IN PHARMACY.

BY HENRY POCKLINGTON.

(Continued from page 360.)

We may conveniently, excluding the bark of the "above-ground stem," adhere somewhat loosely for the present to the first two divisions of our discourse. For, speaking generally, the structure of the very varied underground stems popularly known as roots is identical with the above-ground prolongations, called variously stem, stalk and trunk. Schleiden long ago pointed out that a knowledge of cell-structure and cell-life lay at the foundation of botanical science, and that it only ceased to be empirical in proportion as the acceptance of this truth increased. It is equally important that the analyst should become intimately acquainted with the nature and general morphology of those cells which constitute the plants of pharmacy. To the axiom that "all plants consist of a cell or cells," we add a rider, "whose form-elements are inseparable from their functions." With this in our minds, we will consider how best to become more acquainted with the more minute morphology of plants in general.

I will assume that my readers are familiar with the meaning of the terms most frequently used in vegetable histology (those who are not will derive great assistance from either of Mr. M. C. Cooke's excellent manuals, his 'Structural Botany' or his 'Dictionary of Botanical Terms'). It is difficult, if not impossible, to give anything like an intelligible idea of the very varied forms of cells and their modifications without copious use of well-executed and carefully-printed woodcuts. I have therefore to content myself with a general notice of their principal forms, preliminary to giving directions relative to the best mode of studying their arrangement in the complex plant. The simplest form of cell is not unlike an egg or a grape in shape. The skin of the grape may be taken to represent the primary membrane of the cell, its pulpy contents to represent the protoplasmic contents of the cell, its living matter, and the seeds to very roughly represent the starch and chlorophyll granules often found in cells. An artificial grape, made of india-rubber, and furnished with removable envelopes, might be made to represent all, or nearly all, the varied cell-forms, from the nearly spherical one of pulpy fruits to the elongated duct of the vine and other "woods." A spiral of wire wound in the interior of such a cell would represent the spiral vessel, and perforations through all the coats of the cell but one would give a fair idea of porous cells or dotted ducts. So far as is necessary, I shall give the names and describe the forms or the varied modifications of cells as I come across them in my description of the structure of the various economic plants with which

I am now concerned. But, before I do so, I think it desirable to take my readers through such an examination of an (exogenous) stem as is necessary to enable them to become so familiar with its minute characteristics, that they should be at no loss to identify any portion of it should they meet it in company with other tissues. The necessity of this apparently tedious course will be seen, if it be borne in mind that it is in the form of *powders* that drugs are most commonly adulterated, and that these are nowadays so thoroughly in a state of comminution that it is seldom more than two or three contiguous cells remain in coherence. The more thoroughly the preliminary course of training be gone through, the more easy and reliable will be the work of the analyst.

Suppose now we have an unknown exogenous stem submitted to us for microscopic examination, and desire to give a thorough report of its microscopic characters. This is just such an examination as the microscopical analyst has to make whenever he comes across, as he frequently does, a new importation in the shape of a fresh medicinal root, stem, or bark, which is likely to come into the market in the form of powder or other adulterable fashion. We ask first, is there any pith* (medulla)? If so, are the cells of which it is composed coloured? Are they apparently modified by later deposits (as in *Hoya*) on their primal wall? Do these cells contain any starch? If so, we must examine this under a high power, and take the average size of the granules. We must also examine these by polarized light, both with and without selenites. (I have, in my paper on "The Optical Examination of Beeswax," given some notes on the use of the polariscope in pharmacy. I need not therefore enlarge upon this part of the subject here, further than to say that, for use in analysis, it is of the first importance that the analysing prism should be capable of being rotated.) We must see if there be present other secondary cell-products, such as crystals or raphides. If these be present, we must ascertain their size, shape, percentage to cells, and, if possible, their nature. The diagnostic value of these cell-products is often of the first importance (in examination of pulv. rhei. for example). We should also examine the cells of the medulla in the direction of both their long and short axis, to see whether their walls be pitted (as in elder) or not, and, when pitted, ascertain the nature and arrangement of the "pitting." This done, we shall probably be able to know these cells if we meet them again.

We must next attack the vascular sheath of the medulla. Is this complete or not? That is, do the vessels of which it is composed encircle the pith, or are they (in chicory, for example) in separate wedges? Are the vessels wholly spiral? Are the spirals single, double, or even quadruple? Are they left or right-handed? These questions can be easily answered if their sections be cut in

*In roots this is frequently discernable.

two directions (transverse and vertical) with a sharp razor, and the vessels teased out by needles. The presence or absence of laticiferous vessels, or other receptacula, should be ascertained, and, when present, the nature of their contents (as in rheum. glycyrrhiza, etc.). The character of the cells forming these receptacula is of importance, as in many cases our detection of an adulteration (pulv. rhei) depends upon our familiarity with slight variation of these vessels in closely allied species of the same genus. Glycerine forms the best medium in which specimens of this nature can be examined. The woody layers of the stem or roots next demand our attention, and require its somewhat prolonged exercise. We notice first the arrangement of the medullary cells, their size and nature. We ascertain whether they be porous or not; whether they have any contents, and, if so, their nature, whether organic (starch) or inorganic (raphides or other crystals). We next examine the vessels of the woody layers. These are of the most varied character, and are usually of the greatest diagnostic value. After having noted their distribution through the wood layers, we have to make careful longitudinal sections, so as to expose their walls for some considerable distance. We shall almost invariably find these vessels are what are known as "dotted ducts," and not spiral vessels. Many of those found in the examination of pharmaceutical specimens are exceedingly interesting. I shall describe them in detail by-and-by. The colour of these vessels is of some importance, and should be noted, as also the nature of their contents, if any.

The immediately contiguous prosenchyma next demands our notice. The character of the secondary (sclerogen) deposits, as seen in section, requires to be carefully observed. This applies equally to the woody tissue properly so called, as these cells (called by Dr. Hassall "stellate cells") are often boldly characteristic. Secondary cell-contents, when present, require to be carefully examined, and their nature and quantity determined.

The bark next comes before us. Here, in addition to the relative arrangement of its several parts, we have chiefly to concern ourselves with the presence or absence of inorganic products and of secondary cell-contents in the parenchyma, with the length or shortness of the liber-cells, together with the arrangement of their secondary deposits.

The examination of an endogenous stem, of a corm, bulb, or rhizome, would follow the same general rules, each tissue being separately and thoroughly examined, and the peculiar features of each class of cell entering into its structure accurately ascertained.

In the examination of seeds, the number of their coats should be noted, the nature of the cells composing these, with the character of their contents and secondary deposits. The structure of the seed itself, its receptacula, if any, with the shape and properties of its cell-products, require special attention. In leaves, and foliar organs

generally, the character of the cuticle, number, size and arrangement of stomates and hairs, with characteristics of vessels, cell-contents and deposits, must be observed. To sum up, the work of the analyst in this department requires an intimate acquaintance with the anatomy of the plant, as does that of the physician with the anatomy of the human body.

After this long, but, it is hoped, not useless digression, I will return to the detective work in which I was engaged.

(To be continued.)

THE CLARIFICATION OF SYRUPS BY PAPER PULP.*

BY M. MAGNES-LAHENS.

The method proposed by M. Desmarest, and mentioned in the French Codex, of using finely-divided unsized paper and a woollen strainer for the clarification of syrups, has not met with much acceptance among pharmaceutists. This result, the author thinks, arises partly from the absence of any detailed description of the process, and partly from the difficulties which, at first sight, appear to endanger its successful accomplishment. With the object of completing the description already given, by indicating the points of detail to be attended to in order to attain a satisfactory result, the author has made many experiments, leading him to the opinion that when the numerous advantages of this process are better known, it will be recognized to be one of great value to the pharmaceutist. The object to be attained in effecting clarification by this method is the uniform deposition of the paper pulp, previously diffused through the syrup, upon the sides of the filter, forming a kind of felting through which the syrup is passed. The conditions under which this is best accomplished, the author considers to be as follows :—

First, as to the paper. This should be unsized, white, and of good quality. It should be reduced to a paste by shaking it vigorously in a bottle with a part of the vehicle which forms the base of the syrup.

The filter is best made of the material called swansdown, and in shape like an inverted sugar loaf. Its capacity should be about one-third of the syrup intended to be strained; for instance, a filter of one litre is suitable for three litres of syrup. The quantity of paper required for the felting of a filter of this size is three grams; it will be seen therefore that a litre of syrup requires a gram of paper for its clarification.

* Jour de Pharm. et de Chem., in Phar. Jour. and Trans., April 13, 1872.

The temperature at which the syrup is best suited for clarification the author considers to be from 35° C. to 40° C., (95° F. to 104° F.) When cold the syrup runs too slowly; besides the difficulty met with in dissolving the quantity of sugar in the proportion of vehicle sometimes ordered. When raised to a higher temperature, especially if it approaches 100°C., the syrup passes through too rapidly, and the felting does not act uniformly and well.

These conditions being complied with, the operation may be commenced by pouring the syrup, through which the paper pulp has been previously well diffused, rapidly into the filter, in such a manner as to fill it as soon as possible, and then keep it constantly full until there is no more syrup to pour in. When the greater part of the syrup has passed through, and but little remains in the filter, the felting caused by the deposition of the small particles of paper on the inside of the filter from the syrup in passing through will have been effected. The syrup is then passed through a second time, still keeping the filter full as before, and if the operation be carefully carried out, the result will leave nothing to be desired. In pouring the syrup into the filter the stream should be directed towards the centre, and not on the sides, to avoid disturbing the felting.

The author next discusses the advantages of this method compared with clarification by albumen or by filtering through paper. He states that where simple syrup is clarified by white of egg, a part of the albumen and the whole of the soda is retained in the syrup, and he is of opinion that the albumen, being very unstable in its nature, may sometimes be prejudicial to the preservation of the syrup, while the soda, although present in a very minute proportion, can exercise an injurious influence on some of the chemical compounds contained in medicines where the simple syrup is used. This result is avoided in the paper-paste process, and the product is found to have a clearer and more agreeable flavor. With the same quality of sugar the syrup clarified by albumen is more colored than that for which paper-paste is used; the process, too, requires more time and care, is more expensive, and in consequence of the abundant scum, the waste is greater. Another point claimed is that, as it is not necessary by the paper-pulp process to raise the temperature beyond 40° C., there is no difficulty in maintaining the proper consistence of the syrup.

So satisfactory has the author found this method, that he has adopted it for some time in his pharmacy to the exclusion of the others; preparing by it a syrup which he uses for sweetening medicines, and as a basis for medicated syrup. His formula is as follows:—

Powdered loaf sugar.....	20,000 grams.
Water.....	10,500 "
White filter paper.....	24 "

The sugar on being placed in a deep, wide pan, the water, in which the paper has previously been divided, is added. The pan is then placed on a stove and heated, stirring all the while, until the syrup has attained a temperature of from 35°C. to 40°C. (95°F. to 104°F.) and the sugar is thoroughly dissolved. It is then poured into a filter of from eight to nine litres capacity, the operation being carried out as before described. The product obtained is of great clearness, the density obtained being 35 Beaumè (sp. gr. 1.321). After the syrup ceases to run, the filter still retains about 500 grams. By washing it with a little luke-warm water, pressing it strongly, bringing the liquor to a syrupy consistence, then adding a little paper and again filtering through a small filter, the greater part of of this may be recovered.

Among the numerous syrups of the French Codex, there are a few which are ordered to be filtered through paper filters. The author states that an equally satisfactory product may be obtained by Desmarest's process, while the time occupied is considerably less. One litre of syrup, sp. gr. 1.321, filtered through a large paper filter under the most favorable conditions would require at least sixteen hours, while the same quantity might be clarified in two hours with a swansdown filter and a proper proportion of paper pulp. Finally, with regard to medicated syrups, M. Magnes-Lahens refers to the objection he has before indicated to the use of albumen for clarification, and points out the danger of the principles to which such syrups owe their medicinal properties undergoing change at the temperature necessary for coagulation. Besides this, he states that he has found that a variable proportion (in syrup of lactucarium as much as one-seventh of the whole) of the active principle is taken up by the albumen in coagulation, and therefore entirely lost. He expresses a hope that no pharmaceutist will be led to neglect this process, on account of the dificulties that, apparently, it offers, as he is sure that all these difficulties will vanish at the first attempt, if care be taken in following the directions given. The process may also be used in the filtration of oxymels, etc.

LICORICE.*

BY R. ROTHER.

The ordinary commercial licorice, whether in sticks or powder, is always a very impure substance. The average real soluble extract contained in it exceeds not 50 per cent., and is usually so deteriorated in the process of extraction, that it is but a very feeble representative

* From the Chicago Pharmacist.

of the crude root. The glucoside glycyrrhizin is the representative element of the root. Like the glucosides in general it possesses acid properties and combines with bases. In licorice root the greater part is combined with ammonia, forming a very soluble salt, decomposable by acids with separation of glycyrrhizin, which is sparingly soluble in water, but readily soluble in alcohol. This, when subject to the action of diluted acids, at elevated temperatures, is, similarly to all glucosides, under the same influence, split up into another compound and glucose.

The licorice of commerce is mostly derived from Spain and Italy. There it is obtained by the crude process of boiling the albuminous and starchy root with water, and boiling down the infusion in copper vessels to the required consistence. Other inert substances are frequently incorporated with a view to adulterate or give it firmness. If the infusion, during the process, becomes sour, the glycyrrhizin separates, and eventually suffers decomposition by the action of the acid.

Licorice is much used in medicine; and although medicinally of little importance, yet, however, it is the desire of the pharmaceutist to furnish this, as well as all other pharmaceutical products, of the best attainable quality. Commercial licorice always has an acrid, unpleasant taste, entirely distinct from the peculiar and pleasant flavor of the root. Pharmaceutically, therefore, the crude licorice should never be used. In Europe it is purified for medicinal purposes, by exhausting the crude article with cold water and evaporating the solution to the proper consistence, which may be in three forms, namely: in powder, pilular extract and syrupy liquid. The purified preparations obtained from crude licorice, however, possess its dark color and bad flavor, the insoluble matters only being removed; otherwise, it is no better than at first; even during this operation more of the glycyrrhizin may have been decomposed.

It was found that the licorice root, when exhausted with cold water, and the infusion carefully evaporated to dryness, yielded 20 to 25 per cent. of light brown extract, having the original flavor of the root, equal to 30 to 35 per cent. of pilular extract, or 50 per cent. of syrupy liquid.

The liquid preparations of licorice or licorice root are mostly aqueous or syrupy, and in a dilute condition will not keep without the addition of preservatives. These must be either alcohol, glycerin or saline substances. The, writer, however, discards the first two for this purpose in the three preparations of licorice root about to be noticed. These are liquid extract of licorice, syrup of licorice root and compound syrup of licorice root. Owing to the invariably inferior quality of crude extract of licorice root, it is the opinion of the writed that pharmaceutists should make all the preparations of the so-called licorice directly from the root. This is further supported by the facility with which they can be obtained from this source. In

these processes the writer aids the extract of glycyrrhizin by the addition of more ammonia. The liquid extract of licorice root, when made of the concentration above stated, is very permanent, and will keep almost any length of time in all seasons of the year. It is a purely aqueous solution of pure extract of licorice root, intended for dispensing purposes, and the extemporaneous preparation of simple syrup of licorice root. This latter will not keep long, and must always be fresh as demanded. Compound syrup of licorice root is a permanent syrup of the same strength as the simple syrup, and contains ammonium chloride, which preserves it. This combination is a very popular cough remedy, long and favorably known as Huffland's German Cough Mixture.

Liquid extract of liquorice root is prepared by exhausting the root in coarse powder, by means of percolation with a menstruum, consisting of alcohol 1-4 or 1-6, and water 3-4 or 5-6, with about 2 fluid drachms of about 16 or 18 per cent. ammonia water in each pint of the mixture. The percolate is heated to boiling to precipitate the dissolved albumen, and filtered hot; the residue on the filter is washed with hot water and the filtrate evaporated to half the weight employed. This process may further be stated as follows:

Take of Licorice Root in No. 20 or 24 powder, 32 troy ounces.
Alcohol one pint.
Water sufficient.
Water of ammonia (16 or 18 per cent.) 1¼ fluid ounces.

Mix the alcohol with 5 pints of water and add the ammonia. Moisten the powder with six fluid ounces of the mixture, pack firmly in a cylindrical percolator forming a column of medium height, and pour on the remainder of the mixture, and then water until six pints of percolate have passed; heat this to the boiling point and filter; when the liquid has disappeared from the surface mix the residue with a pint of water, heat and filter; mix the filtrates and evaporate the liquid carefully, until it weighs 16 troy ounces.

Syrup of licorice root is prepared as follows:—

Take of Liquid Extract of Licorice Root one drachm.
Syrup sufficient to make one fluid ounce.
Mix.

To make compound syrup of licorice root the writer's first process consisted in exhausting the root with water by percolation, boiling the percolate, filtering, evaporating the excess of liquid, dissolving the ammonium chloride and sugar in the residuary liquid with heat, and straining whilst hot.

This method, however, was found too circumstantial. The root was then treated with repercolation with water, and also with water containing some of the ammonium chloride. To the strong percolate the ammonium chloride was then added, the quantity used forms

a nearly saturated solution of the salt. This at once produces a dense resinous precipitate, which rapidly subsides as a heavy tenacious mass, insoluble in water, but rapidly soluble in ammonia or disodic carbonate, and then again readily miscible with the saline solution from which it had separated. It is, therefore, evident that ammonium chloride separates the native combination of glycyrrhizin from its solution prepared with cold water, and also that a sufficiency of ammonia previously added prevents the precipitation, probably by forming a more basic salt of glycyrrhizin, which is soluble in a saturated solution of ammonium chloride.

From these observations the writer derrived the following excellent and expeditious process long and successfully employed :—

Take of Licorice Root in No. 24 powder, 32 troy ounces.
Ammonium chloride in No. 24 powder; sufficient.
Sugar 6½ lbs. avoirdupois.
Ammonia water (16 or 18 per cent.), 3 fluid drachms.
Water sufficient.

In 6 pints of water dissolve 6 troy ounces of ammonium chloride and add the water of ammonia, moisten the root with 6 fluid ounces of this mixture, pack it firmly in a cylindrical percolator and pour on the remainder of the mixture, and then water until 4 pints of percolate have passed; in this dissolve 12 troy ounces of ammonium chloride, pour part of this solution upon the sugar, and when it has crumbled add the remainder; stir frequently with a pestle until the sugar has dissolved and strain through muslin. No heat is employed in this process, and the ammonia is completly saturated. The preparation is dark brown and permanently clear and transparent; it contains some albumen, and one fluid ounce contains one drachm of ammonium chloride and approximately represents 2 drachms of licorice root.

TESTING OF CITRIC ACID FOR TARTARIC ACID CRYSTALS MIXED WITH IT.

BY DR. H. HAGEN.

An adulteration of citric acid with tartaric before it is brought to crystallization can hardly occur, and should it happen the tartaric acid would partly crystallize by itself on the citric acid crystals, and partly be contained in the citric acid in the form of a mother liquor held by the crystals. The detection of the tartaric acid would then be possible in every crystal of citric acid. Ordinarily the adulteration is practiced by throwing the tartaric acid crystals in among

those of the citric acid. In order to detect this fact the writer has made use of the following two methods:—

1st. A solution of 40 grms. of fused caustic potassa is made in 60 c.c. of water, and this solution is mixed with 30 c.c. of 90 per cent. alcohol. This solution is poured on a glass plate with a smooth bottom, so that a film of the liquid has a depth of about 0.6 c. m. when several crystals both large and small, of the citric acid to be tested are laid in the quiet solution about three to five centimetres from one another. The plate should rest on something dark colored, and remain quiet to avoid any agitation of the liquid in it. After two to three hours the citric acid crystals are found to be nearly or quite dissolved, and in their stead is left a small, delicate, white, dust-like spot. The tartaric acid crystals appear on the other hand to be only a slight degree dissolved, whitish and cloudy, covered by a coat of small whitish needle crystals, and surrounded by a deposit of small overlapping groups of crystals, or a thin though broad crystalline film. The citric acid crystals appear, after several minutes' action of the alkaline solution, clearer and more transparent, the tartaric acid crystals cloudy and white.

2nd. The second test consists in pouring upon a flat white porcelain plate to the depth of about 0.5 centimetre a dilute transparent solution of manganate of potassa, which has been rendered strongly alkaline by the addition of a solution of fused caustic potassa, and placing the crystals in it while standing quietly, at distances of four or five centimetres from each other, so that the tops of the crystals reach to the surface of the liquid, or even project above it. This is then allowed to stand for two to three hours, all shaking of the vessel being guarded against. In the place of the tartaric acid crystals, there will be found yellow or colorless spots: the crystal seldom has gone completely into solution; on the other hand, where the citric acid crystals have been, the solution shows a green color with a tendency to blue or violet. The citric acid crystals are usually dissolved, if they have not been too large.

The first method is the best and safest. For success in the test, however, the alkaline solution should be made exactly as described; since a slight departure from the given method shows itself immediately by modifying the result. With quite pure citric acid the white spot mentioned does not always appear; it, however, never fails to appear with commercial citric acid, and undoubtedly is due to the presence of lime salts.—*Pharmaceutische Centralhalle in American Chemist.*

ON THE AMOUNT OF MOISTURE CONTAINED IN AIR-DRY DRUGS.*

BY GEO. W. KENNEDY.

Read at the Pharmaceutical Meeting, March 10th, 1872.

How many pharmacists would believe it if informed that the drugs which they are daily handling contain from 10 to 18 per cent of moisture, which they lose in drying? I myself could scarcely credit it when my first experiments were made, and thought I might have lost some of the drugs between the repeated weighings, but repetition of the experiments always confirmed the results previously obtained. Even the powders, which are supposed to be dry or very nearly so, lose in some cases from 8 to 10 per cent of moisture.

I have experimented with a large number of drugs, sufficient, I believe, to give the pharmacist a true idea of the amount of moisture contained in them, and the results show conclusively that such pharmaceutical preparations like syrups, tinctures, fluid extracts, &c., must be much weaker when prepared from merely air dry material than when made from anhydrous drugs.

The process of drying was conducted in a common cooking stove oven, at a temperature of about 120° Fahrenheit, to which the drug was exposed until it ceased losing any more weight. By being exposed to a low but continuous heat the loss in volatile oil may probably be greater than when the drug is dried at an elevated heat, but its normal amount is very small in most of the drugs experimented with, so that the deduction of the volatile oil expelled in drying would alter the figures below but little.

The dried drugs were placed in a room for two weeks and then reweighed, the increase of weight representing the amount of moisture reabsorbed in that time. While these experiments were made the weather was cold and dry, and this circumstance doubtless accounts for the smaller percentage absorbed again, while in a few cases the loss of volatile oil may explain a portion of the deficiency.

The following tables show the loss sustained by the drugs mentioned, and the gain in weight of the dried articles under the circumstances mentioned above:

*From the American Journal of Pharmacy, April, 1872.

1. ROOTS, RHIZOMES, &c.

	Loss.	Yield.	Gain by re-absorption
Lappa,	16·25	83·75	10·40
Calumba,	16·	84·	11·50
Taraxacum,	15·25	84·75	9·75
Asclep. tuberosa,	15·25	84·75	10·75
Cypripedium,	14·	86·	5·
Gentiana,	13·	87·	9·
Panax,	12·75	87·25	4·75
Krameria,	12·67	87·33	9·17
Polygonatum,	12·60	87·40	6·80
Scilla,	12·50	87·50	8·50
Althæa,	12·50	87·50	8·50
Gossypium,	12·40	87·60	6·40
Helleborus Niger,	12·	88·	8·25
Colchicum,	11·50	88·50	8·
Inula,	11·40	88·60	6·40
Rheum,	11·33	88·67	8·33
Spigelia,	11·25	88·75	7·25
Podophyllum,	10·33	89·67	6·73
Serpentaria,	10·33	89·67	5·83
Senega,	10·30	89·70	5·67
Asarum canad.,	10·25	89·75	3·85
Valeriana,	10·20	89·80	6·
Sarsaparilla,	9·	91·	4·50

2. STEMS AND WOOD.

Dulcamara,	12·	88·	6·33
Quassia,	10·	90·	8·

3. BARKS.

Rhus glabrum,	14·67	85·33	8·67
Xanthoxylum,	14·50	85·50	8·50
Cinamomum,	10·50	89·50	6·50
Prunus Virg.,	10·	90·	5·25
Cinch. calis.,	9·	91·	2·80

4. HERBS.

	Loss.	Yield.	Gain by re-absorption.
Absinthium,	14·	86·	8·50
Hedeoma,	12·25	87·75	8.25
Lobelia,	11·60	88·40	5·60
Leonurus,	10·80	89·20	5·20
Glechoma,	10·33	89·67	6·33

5. LEAVES.

Uvularia perfol.,	18·	82·	8·
Conium,	16·	84·	6·
Cataria,	14·50	85·50	11·50
Aconitum,	14·	86·	9·25
Belladonna,	13·75	86·25	5·75
Hyoscyamus,	12·25	87·75	5·85
Senna Alexand.,	12·20	87·80	7·20
Melissa,	11·75	88·25	7·80
Matico,	11·	89·	6·
Tussilago,	10·50	89·50	4·67
Salvia,	10·50	89·50	8·
Stramonium,	10·33	89·67	7·83
Rosmarinus,	10·25	89·75	6·65
Uva ursi,	10·	90·	4·
Buchu,	9·20	90·80	4·40

6. FLOWERS.

Lavandula,	14·25	85·75	7·75
Arnica,	13·80	86·20	8·80
Anthemis,	9·80	90·20	6·80

7. SEEDS.

Stramonium,	10·	90·	7·

8. POWDERED DRUGS.

Rheum,	8·25	91 75	5·25
Inula,	8·33	91·67	5·30
Calumba,	8·50	91·50	7·
Colchici Rad.,	9·	91·	6·
Sanguinaria,	9·	91·	7·
Cimicifuga,	9·80	90·20	4·80

TO DETECT SULPHURIC ACID IN VINEGAR.*

BY JAMES T. KING.

The salts of barium are far too delicate a test for free sulphuric acid in vinegar. When it is made by the oxidation of alcohol, the water used for diluting the spirits, in many localities, contains sufficient sulphate of lime or other sulphates to give a decided re-action with chloride barium, and if the vinegar be made from cider it will generally give evidence of the presence of a sulphate with this test, even when the sample is pure and free from the usual adulteration.

The following process will detect the five-hundredth part of free sulphuric acid, and is sufficiently accurate for all practical purposes. An ounce of the vinegar to be examined is put into a small porce-

* From the American Journal of Pharmacy.

lain capsule, over a water-bath, and evaporated to about half a drachm, or to the consistence of a thin extract; when cool, half a fluid ounce of stronger alcohol is added and thoroughly triturated. The free sulphuric acid, if present, will be taken up by the alcohol to the exclusion of any sulphates. Allow the alcoholic solution to stand several hours and filter; to the filtrate add one fluid ounce of distilled water, and evaporate the alcohol off by gentle heat, over a sand-bath; when free from alcohol it is set aside for several hours and then again filtered. To the filtrate, acidulated with hydrochloric acid, add a few drops of a solution of chloride barium, and a white precipitate of sulphate of barium will result, if the sample of vinegar has been adulterated with sulphuric acid.

MANUFACTURE OF GLUCOSE,

It is now nearly sixty years since Kirchhoff discovered that by boiling gelatinous starch with dilute sulphuric acid, and afterwards neutralizing the acid by chalk, a peculiar variety of sugar may be produced. This substance—grape-sugar, or glucose—possesses only three-fifths the sweetening powers of cane-sugar, but for various purposes its manufacture on a large scale has been carried on in Europe; and we have seen samples prepared in this country that in appearance, though not in taste, were equal to the more common grades of Muscovado. The fabrication of saccharine substance from starchy material has been, is, and will be the subject of much experiment, and may eventually culminate in an extended American industry, although such a result is by no means near at hand. The following extract from an article in the *Journal of Applied Chemistry*, written by Professor Chas. A. Joy, details the more practical methods of manufacture, and most prominent uses for which the product is used:

"One of the latest methods for the preparation of grape sugar is the one proposed by Maubré, and is as follows:—The mixture of dilute sulphuric acid and starch-meal is boiled under pressure of six atmospheres. The necessary boilers are similar to those used for high-pressure engines, and are lined with lead and provided in the interior with a perforated lead tube for the passage of steam. The boiler is further furnished with safety valve, stop-cocks, thermometer, etc. In the process of manufacture 56 pounds of sulphuric acid of 66° B. are diluted with 5,600 pounds water, and heated to 212° F., A mixture of the same amount of acid and water is made in a separate wooden vessel, the heat of which is raised to 86° F. Into the second mixture 2,240 pounds of starch-meal are well stirred and heated to 100° F. This is gradually added to the first mixture, and after heating with open valves for a few minutes to 212° F., the stop-cocks are all closed and the heat raised to 320° F., and continued until all of the starch is converted into sugar, which requires from two to four hours.

"The contents of the boiler are then run into a wooden tank, and 168 pounds of pure chalk or carbonate of lime, previously stirred

with 500 lbs of water, are gradually added to neutralize the acid; the gypsum is caught on a filter and the filtrate evaporated to 20° B., and afterward clarified by blood and bone-black, and again filtered. In this way the product is obtained pure and free from bitter empyreumatic taste, and is well suited to any of the purposes to which grape sugar is adapted.

"Another way is to convert the starch into sugar by means of malt. For this purpose 10 to 12 pounds of barley malt are well stirred with 400 pounds of water, and to this are added 100 pounds of starch and the whole is heated to 158° F., and kept at that temperature for several hours, under constant agitation. At 158° F. the starch becomes pasty, the grains burst, and at first there are no signs of sugar, but in a quarter of an hour the liquid becomes more fluid, and begins to have a sweetish taste. Great care must be observed to retain the heat at the same temperature, not to have it either higher or lower than above indicated, and to insure this several thermometers ought to be placed in different parts of the apparatus. After six hours the liquor ought to be filtered and clarified, and evaporated to a syrup. The sugar prepared in this way always retains the taste of malt, and is only adapted to use in breweries, where this property will not prove deleterious.

"Grape-sugar, or glucose, can be prepared in open vessels by allowing a mixture of starch and water to flow gradually at a temperature of 130° F. into a vat containing water acidulated with one per cent of sulphuric acid. By keeping it at a boiling point the starch is at once altered, without producing mucilage. The amount of starch taken is usually about one-half the weight of water employed. After all the starch is added, boil for half an hour and decant. The sulphuric acid is neutralized by carbonate of lime as before, and the liquid evaporated to the specific gravity of 1.28, and set aside to crystallize. The molasses is allowed to drain off, and the sugar is dried at a gentle heat in a current of dry air.

"In the United States, especially in the West, it is more economical to make grape sugar from corn. There are several large establishments where this business is now extensively prosecuted. The corn is steeped in weak soda lye to separate the husk and soften the gluten. It is then ground wet, and run through revolving sieves, by which the husks and gluten is separated. The starch flows through long ways and troughs, in which are slats against which the solid particles lodge, and thus separate from the water. The wash water is run into a large cistern, where it can be fermented into weak vinegar. The starch is put in a mash tub, and treated with one per cent. sulphuric acid in sufficient water for three to eight hours. Where it is intended to make sugar the whole of the starch is converted, but if syrup is sought then some part of the dextrine is left unaltered. The acid liquor is neutralized with chalk as before, and evaporated in vacuum pans, and, after the separation of the gypsum, is run into barrels and allowed to crystallize. For syrup, a

certain percentage of dextrine is left unconverted, which helps to keep it from crystallizing; and in the manufacture of syrup special care must be observed to neutralize all of the acid. The sugar is sometimes cast into blocks six inches square and dried on plaster plates in a current of dry air, as hot air would be apt to discolor it. . . . . An excellent article of starch sugar can be prepared from Indian corn, which will yield alcohol one-eighth cheaper, and quite as pure as that from cane-sugar. As, by a recent decision of our courts, the manufacturers of alcohol and vinegar from this source are not distillers within the meaning of the tax levy, the business is not hampered by licenses, inspections, or stamp duties, and has thus a great advantage over ordinary distilleries."

DRUGGISTS' APPRENTICES IN PRUSSIA.

The following extract from the Prussian Pharmacy laws is quoted in a paper on "Pharmacy in Austria" by Thomas Greenish, F.C.S., which was read at a late meeting of the Pharmaceutical Society of Great Britain, and published in the *Transactions*:—

"All apothecaries may take apprentices, but as they sometimes study their own advantage more than they do that of the apprentice or the public, the following has been made binding:—They must only take such apprentices as have by nature good parts, and as are sufficiently prepared by education and good moral training. In order that apprentices may not be taken from school too soon, it is enjoined that they do not leave before the age of 14; and as the knowledge of the Latin language is indispensible for properly understanding prescriptions, no apprentice shall be taken until he can translate easy passages from a Latin author. The decisions shall not be left to the masters themselves, but it shall be their duty to let the *intended* apprentice be examined by the Government Medical Officer. The master has further to see that the intended apprentice writes fluently and distinctly; this is particularly necessary to prevent mistakes occurring and the patient being misled by illegible writing.

"It is the duty of the master to provide proper books for the apprentice. It has occurred that apothecaries in many places have had other business than that of an apothecary to attend to, and that sometimes they have no *assistant*, but only three or four apprentices instead, and they prefer to take the roughest and most ignorant of boys, and also those that are too young, because they could make use of them for the rough work in their other businesses; and as the practice has led to an increase in the number of mere mechanical chemists' assistants, it is hereby ordered that an apothecary be allowed to take only as many apprentices as he has qualified assistants. If the business be so inconsiderable that one person only be employed, then no apprentice can be taken unless it be impossible to procure an assistant, or that the master be sufficiently skilful to take the place of assistant.

"To prevent the increase of badly trained assistants, it is ordered that for the future no master shall give his apprentice a certificate until the said apprentice has been examined by the Government medical officer in the presence of his master. The examination shall refer to such subjects as he has a right to expect from so young a man. He shall be particularly examined as to his practical knowledge of pharmacy and handiness in doing ordinary work, as practical knowledge is of more importance than mere theory in an apothecary. Should it be found that he is not yet a capable assistant, it is the duty of the Government medical officer to inform him that he cannot yet leave his apprenticeship, but must remain until he has fully qualified himself. Should it, however, appear that the master is more in fault than the apprentice and that he has neglected him or shown his own incapacity to instruct him in the business of an apothecary, that master shall be forbidden to take another appre .ce."

Mr. Greenish makes the following remarks on the subject:—Then again, the Minor examination is a qualification for an assistant only; he cannot conduct the business in the absence of the principal, neither can he purchase a business for himself. Our Minor less thorough in its character, and less crucial, is a qualification for business as a chemist and druggist. But those who believe that pharmacy is progressive must arrive at the conclusion that an alteration here is only a question of time. After the Minor, three years must be spent in the practical details of pharmacy, and then the assistant goes to the university. Here lectures with practical work occupy his time, and after two severe examinations he procures his diploma, a qualification which enables him to conduct pharmacy.

It will be noticed that in the examinations both of North Germany and Austria a knowledge of those political laws which govern the practice of pharmacy is required of the student; and in practice he does understand the letter and spirit of those laws. In this country when questions arise immediately affecting the interests of pharmacists, it is not until the danger is at our door that the body at large can be made to understand them. Our position, as defined by the several Pharmacy Acts and Poison Regulations, is so imperfectly understood, that our strength, as a body, is weakened, and our influence diminished. In the old Apothekerordnung, it was imperative that every pharmacy should have a laboratory attached to it; this brought into existence small apparatus suitable to the requirements of a pharmacist desirous of making the preparations of the pharmacopœia for his own establishment, a want much felt in this country where our pharmaceutical engineers cannot be made to understand that an ordinary room may suffice for a very efficient laboratory, where an acre of ground is not available.

I hold it to be the bounden duty of every one that takes an apprentice to teach him, or cause him to be taught, to make every preparation in the British pharmacopœia, and this may be done at a very moderate outlay. He should also be taught the history of most of the substances which constitute our materia medica, as well as how to recognize them.

Editorial.

PURE ALCOHOL AS A SUBSTITUTE FOR WINES AND LIQUORS IN MEDICINE.

Though viewing with all respect the recently published medical declaration regarding alcohol, and yielding due deference to the opinions of the illustrious physicians who have affixed their signatures thereto, it may still be assumed that a belief in the medicinal properties of this omnipotent stimulant is so firmly rooted in the mind of the majority of physicians, as well as that of the people, that it will hold its own against all opposition as long as the world lasts. Alcohol, in some form or other, has, from the earliest ages been used as a remedial agent. In the form of wine its employment is frequently mentioned in the writings of the ancients, sacred and profane. "Use a little wine," is the apostolic injunction, "use a little wine for thy stomach's sake and for thine often infirmities." We may mention, by the way, that it is somewhat remarkable that the talented author of a paper on the Pharmacy of the Bible, which is published in another part of this journal, should, somehow or other, have overlooked the existence of wine as an article of the *materia medica* of the past. That so important a medicine should have been left out from an enumeration which is, otherwise, so comprehensive and exact, is certainly an oversight.

Bearing in mind the fact that wine, and other liquids of a similar class, have been used in medicine from the earliest times until the present, and assuming that whatever virtues these liquids possess may be almost exclusively ascribed to the alcohol contained in them, it appears strange that for so long a period no thought was ever entertained, or, at least, ever carried into practice, of employing alcohol itself. The various varieties of wine—the numerous forms of spirituous liquors made in different countries, have each been extolled as possessing properties peculiar to themselves. Different nations have their particular notions respecting their favorite beverages, and physicians appear to have fallen into the general track. It would seem that a knowledge of the composition of these liquids has had little to do with their selection and perma-

nent establishment. Compounds, the most vile and impure, have been held as the very nectar of the gods—the famous "poteen," or real "old Scotch," for instance. It would be difficult to imagine a more hurtful compound than the first of these, yet there are many persons who have the most implicit faith in its virtues over all other forms of spirit. It may be that nationality has a great deal to do with this belief, and that love for one's country and all that belongs to it has tended to this obfuscation of common sense. There are, however, some liquids whose employment is as universal as their reputation is cosmopolitan. Foremost amongst these is the famous *eau de vie*—the *spiritus vini Gallici* of the physician. There may certainly have been a time when the relation between brandy and wine was more marked than it is in the present day, and under such circumstances the selection of the latter liquid might be to some extent justifiable. In these times, however, the vinous origin of the potent spirit is involved in an obscurity into which it would be folly to penetrate. We must seek our vine amongst the *Graminaceæ* if we would find the true source of our brandy. Poisonous compounds of amyl, fœtid fatty acids, burnt sugar, and a dash of catechu, or oak shavings, complete the history. We do not wish to be understood as asserting the impossibility of obtaining a genuine liquor, but we would say that by far the greater part of that which is vended as genuine does not possess the slightest claim to the appellation. Even allowing the source to be clearly traceable, it yet remains to be proved that these scarce and high-priced articles have any advantage over the purer form of diluted alcohol. The flavor of spirituous liquors is mainly due to the presence of amylic and ethylic combinations of the fatty acids, and it is well known that these exercise a very injurious influence on the animal economy. The form of alcohol known as *pure spirits* is not open to these objections. The ordinary commercial article may be obtained of absolute purity, and almost altogether devoid of odor or taste. If an alcoholic stimulant is required, why not dispense this in the same way that any other medicine would be dispensed.

Our attention has been directed to this subject by learning that some of our physicians have broken through the ice, and have commenced prescribing spirits in the manner we have alluded to. We think the change a most rational one, calculated to furnish the patient with a pure medicine, and, at the same time, to materially

lessen the chances of a taste being cultivated which might lead to after indulgence—the absence of flavor would doubtless tend to retard this result.

When dispensing spirits in this way druggists should remember that *pure spirit* should alone be employed: commercial alcohol, although deprived of its fusel oil, contains other impurities which are equally, if not more injurious.

CHICAGO COLLEGE OF PHARMACY RELIEF FUND.—From a notice inserted in a late number of the *Phar. Jour.* of London, we learn that up to April 13th the subscription obtained in England amounted to $2,250, besides a number of books and specimens valued at $500. It is expected that by the time the subscription list is closed, the sum obtained will amount to $2,500. It is proposed that one-half of this be expended in books, and the remainder in apparatus and specimens for the illustration of lectures. In this matter, however, the wishes of the Chicago College will be consulted. It will be remembered that by the great fire our Chicago brethren lost all they possessed. The total value of books, specimens, apparatus, etc. destroyed was estimated at $10,000. This was certainly a very discouraging blow to an institution considerably younger than our own. We are glad to learn, however, that there is every probability that the loss will be fully made up. It might be taken as somewhat of a reflection on Canadian enterprise and zeal for the advancement of Pharmaceutical science, if we were to say that as far as the possessions of the Ontario College of Pharmacy are concerned, the Council do not entertain the slightest dread of the most overwhelming conflagration that could befal them.

GELATINE SUPPOSITORIES.—We believe that the credit of having first introduced gelatine suppositories belongs to a Canadian pharmacist. In September, 1870, we received from Mr. T. Carre, of Meaford, a specimen which was stated to be nearly two years old. In the October number of the JOURNAL (Vol. III., No. 30, p. 144, we published an extract from Mr. Carre's letter, in which he described

the manner of making the suppositories, and also stated the advantages possessed by the new material. The formula recommended does not differ materially from that given by Mr. Brady, at the last meeting of the American Pharmaceutical Association, and although it is quite possible that both gentlemen may have been engaged in independent experiments on the same substance, at the same time, it appears that to Mr. Carre belongs the credit of having first brought gelatine suppositories into public notice.

REGISTRATION NOTICE.

The list of registered chemists and druggists will be published on the 15th of this month, when the JOURNAL will be discontinued to all not registered, or associates. Those who have overlooked the matter should remit at once, in order to preserve their file of the JOURNAL complete, as the publishers cannot guarantee to supply back numbers.

COLLEGE OF TECHNOLOGY.

Pharmaceutical students are reminded that the lectures on Chemistry, at the above institution, will commence on Monday, June 3rd, and be continued on every Monday, Wednesday and Friday evening throughout the session, lectures commence at 7.45 p.m. It will be remembered that arrangements were made with the College authorities for students to attend these classes, free of charge, and although it has since decided that the same privilege be extended to the public during the first session, it is hoped that our young friends will not, from this consideration, underrate the benefits to be derived from attending.

We have no doubt that employers will arrange matters so that assistants and apprentices may avail themselves of the opportunity thus afforded.

Editorial Summary.

PRESERVATION OF OINTMENTS.—It is said that by the addition to *Ung. Hydr. Nitrat.* of one-fourth part of glycerine, subsequent hardening of the ointment is prevented, and the citrine color preserved. *Ung. Hydrarg. Oxid. Rubr.* may also be preserved for an indefinite length of time by covering it with a layer of glycerine.

ARTIFICIAL MILK USED DURING THE SIEGE OF PARIS.—At a meeting of the Liverpool Chemists' Association, Mr. J. T. Armstrong exhibited specimens of artificial milk and butter used by the inhabitants during the siege of Paris. The mode of preparing the "siege milk" is as follows:—47 grms. of finely-powdered sugar, 30 grms. of the white of an egg, or a sufficient proportion of gelatine, one part of warm water, and about one grm. of carbonate of soda, are mixed with 60 grms. of a pure and tasteless oil, or fat obtained by frying; by agitation a pasty liquid is obtained, which, when diluted with about an equal bulk of water, has the same nutritive value and chemical composition as milk.

OCCURRENCE OF COPPER IN OIL OF CAJUPUT.—From experiments made by Edward Histed, (*Pharm. Jour. and Trans.*) on six specimens of oil of cajuput, the presence of copper was satisfactorily shown to be the source of the green color. That copper is not of necessity present, because the oil has a green color, was proved by Guibourt, who distilled the leaves of several species of *Melaleuca*, *Metrosideros*, and *Eucalyptus*, cultivated at the Jardin des Plants in Paris, and obtained from them volatile oils of a fine green color. Mr. Histed also tested the oils of bergamot, wormwood and cubebs, without finding any copper. It is estimated that the amount of copper in ordinary cajuput is not over 0·27 parts in 1,000. This quantity is so small that in medicine it may be practically disregarded.

TOMATOES AS A SOURCE OF CITRIC ACID.—The fruit of the tomato plant, *lycopersicum esculentum* has often been suggested as a source for citric acid, but from the experiments by Mr. McElhenie, detailed in the May number of the *American Journal of Pharmacy*, it would appear that the amount of acid is almost in-

significant. One gallon of juice obtained from a fleshy variety of tomato was treated in the manner directed in the *British Pharmacopœia* for the preparation of citric acid from lemon juice. After repeated concentrations, performed at intervals allowed for crystallization, a small quantity of impure crystals was obtained. The yield is stated as being very slight, not exceeding ten grains to the gallon of juice, representing about nine pounds of fruit. An attempt was made to estimate the amount of malic acid, but, owing to an accident, the quantity was not arrived at nearer than a guess that it was greater than the amount of citric acid. Oxalic acid was obtained, but the weight is not given. No trace of tartaric acid was found. A second series of experiments was instituted, in which one gallon of juice was evaporated to three ounces, neutralized with calcium hydrate, and the acids isolated from the lime salts. The result was similar to that obtained in the first instance. Though these experiments appear conclusive as to the existence of citric acid in paying quantities in tomatoes, it may be remarked that the absence of correct statements as to exact quantities would lead us to doubt the care with which the experiments were made.

BRANDY FROM WOOD SHAVINGS.—C. G. Zetterlund has been making some experiments in the distillery at Hulta to make brandy out of shavings. For this purpose they were boiled in an ordinary kettle under a pressure of 0.116 kilograms of steam to the square centimeter. There was then put into the kettle:

Shavings, (pine and fir, very wet)	9.0 cwt.
Sulphuric acid, 1.18 sp. gr	0.7 cwt.
Water	30.7 cwt.
Total	40.4 cwt.

After boiling eight and a half hours the mass of shavings contained 3.33 per cent. grape sugar, and after 11 hours' cooking 4.38 per cent. A farther increase in the quantity of sugar could not be attained. There was attained in all, from the 40.4 cwt., about 1.77 cwt. of grape sugar. or about 19.67 per cent. of the weight of the shavings. The acid was neutralized by lime, so that the cooled mash ready for fermentation contained one-half degree of acid, according to Ludersdorff's acid tester. The mash had a temperature of 30°C. when the yeast prepared from only 20 pounds of malt was added. At the end of 96 hours the mash was done fermenting, was then distilled, and yielded 61 quarts of 50 per cent. brandy at +50°C., perfectly free from all smell or flavor of turpentine, and of a very pure taste. It is more than probable that the manufacture of

brandy from shavings on a large scale would succeed if it were ascertained by experiment with how much water the acid must be diluted and how long it must be boiled, for both of these circumstances exert a great influence over the production of the sugar. If it were possible to convert the whole of the cellulose in the shavings into sugar, each hundred weight of air-dried shavings would yield about seven gallons of brandy of 50 per cent. The shavings of the leaf-bearing trees would probably give the best results.—*Jour. of App. Chem.*

Correspondence.

The editor is not responsible for the statements made by correspondents, nor does he of necessity endorse the views advanced. This department of the *Journal* is open for the free and ungarbled discussion of matters connected with the local or general interests of pharmacy, and communications will at all times receive due attention. The signature of the writer should always be appended, but need not necessarily be published unless it is so desired.

PERCOLATION *vs.* MACERATION.

To the Editor.

DEAR SIR,—Permit me through this medium to say a few words regarding the preparation of tinctures by Maceration *versus* Percolation. This subject has already been extensively enlarged upon, and all that has been said and written *pro. et con.* shows that by maceration, if the ingredients are of good quality, with menstruum of proper strength, and frequent agitation, a tincture of reliable quality will be obtained. While by percolation the product is frequently uncertain, even if the greatest care be exercised, the only argument in its favour being the comparatively short time required for its preparation.

Strange to say the United States Dispensatory of 1865, says so little in favour of percolation and also states that it is liable to objection, while, at the same time, it recommends many of the tinctures to be made by that process.

Now if a mode of preparation is almost impossible to be properly conducted by one-half of the druggists, or, at least, with uncertain results in the preparation of many tinctures, and by another mode a reliable result can always be obtained—should we give up a reliable mode of preparation for an uncertain one? As regards the

short time required for the preparation of a tincture by percolation, this should be no guarantee for a mode of preparation which is doubtful. If a tincture is required on short notice, we have a source of supply in reliable fluid extracts. By using one ounce of the fluid extract for each ounce of the crude material ordered by the Pharmacopœa and adding dilute alcohol to make up the quantity to the amount each ounce should make.

We have thus a tincture in regard to dose and effects which is reliable and often this mode of preparation is preferable, whereas in Tinct. Ergotæ, Bucco. Digitalis, &c. a tincture is sometimes preferred by the physician to contain as small a quantity of spirit as possible, in which case ¼ alcohol of .95 per cent and ¾ water may be employed and even reduced to ⅛ of alcohol if wanted for immediate use.

Now by preparing Tinct. Gent. Co., Cardamom Co., Cinchon Co. and even Gentian or Colomba by percolation they yield a preparation not more than three-fourths as strong and some cases less than that prepared by maceration, which is very natural to expect. For although the strength can be entirely exhausted from wood ashes by leaching, the particles of ashes are entirely different from the particles of root, barks, &c. used in the preparation of tinctures. In the first case they are so porous as to be perfectly saturated, and water would almost as easily pass through the particles as pass between them. While in the second case the particles are generally woody fibres and although frequently easily saturated, yet the percolation must be imperfect. If we take a fine powder it is almost impossible to percolate it properly owing to the glutinous portions forming a kind of paste through which the menstruum passes but imperfectly. If reduced to a moderately fine powder the particles are not thoroughly exhausted, and if these particles be dissected and examined under a strong magnifying glass, the inner half will have more of a gummy appearance, and the exterior more of a porous appearance, showing that the menstruum will find its way between the particles, rather than through them, exhausting the exterior, while the interior is but very imperfectly exhausted. Now, take the residue after being exhausted by percolation, and subject it to a process by maceration a tincture of about half the strength of that by percolation will be afterwards obtained, clearly showing that percolation does not exhaust the drug as perfectly as maceration.

Let us take for example Tinct. Colchici Sem., which is directed to be prepared by percolation, both by the U. S. and Br. Pharmacopœias. From the compactness and tenacity of the seed the difficulty of procuring a reliable preparation by such a process can easily be imagined. In my experience I have never been able to procure a tincture of it by percolation of more than about half the strength it should be. These are not mere assertions but based on the experience of several years of careful observation, and many experiments.

MACERATION.

Answers to Correspondents.

A. J. Martin—Your communication has been handed to the publisher, and will, no doubt, receive immediate attention.

Mr. R. Barker, of Brighton, sends the following formula for oil of spike as having been used by him for fifty years, and yielding a preparation in all respects satisfactory. A recipe for British oil is also appended:

Oil of Spike.—

Barbadoes Tar	2 pints.
Ol. Terebinth	1 "
Ol. Lini.	1 "
Ol. Lavand. Exot	2 oz.

British Oil.—

Ol. Terebinth	1 pint.
Ol. Lini	1 "
Barbadoes Tar	1 "
Crude petroleum	8 oz.
Ol. Succini (or Juniper)	1 oz.

Wm. T. Bray, Wingham.—In regard to the formation of a local association in your vicinity it might be the best course to lay a statement of the matter before the Council, whose next meeting is on the first Wednesday in August. At the last meeting of the Council it was decided that the formation of local associations should be encouraged by a small grant of money. This can only be claimed on presenting a certified statement that regular meetings have been organized, and that such have heen held regularly twice a month during the winter season, say from the first of October until the first of April. This would not, of course, meet the case you describe, but we have no doubt that if the matter is represented at the next Council meeting that it will receive due attention, and that some arrangements can be made allowing the meetings to be held at any season.

Transactions of Pharmaceutical Colleges and Societies.

CHEMISTS AND DRUGGISTS IMPROVEMENT SOCIETY, LONDON, ONTARIO.

This Society was formed in September of last year, and its first examination was held at the Mechanics' Institute, on Monday,

the 6th May. The examination was a written one, and was conducted, as nearly as possible, according to the usual form. On the following Wednesday, a general meeting of the Society was held at the same place, when the following prizes were distributed :—

	FIRST YEAR CLASS.	SECOND YEAR CLASS.
Materia Medica.—	1st. Jas. Bowman,	1st. F. J. Osborne,
	2nd. H. Heal,	2nd. None.
Chemistry.—	1st. Jas. Bowman,	1st. F. J. Osborne,
	2nd. Nelson Gumaer,	2nd. Alfred Hogg.

After the prizes were distributed the election of officers for the ensuing year was proceeded with. The result is as follows :—

President, Dr. F. H. MITCHELL.
Vice-President, H. ROSSER.
Treasurer, F. J. OSBORNE.
Secretary, J. WILLIAMS.

It is intended to hold semi-monthly meetings during the summer months for the study of Botany, and, on the 1st of Oct. the regular weekly meetings will commence and be carried on as were those of last winter.

PHARMACEUTICAL ASSOCIATION OF THE PROVINCE OF QUEBEC.

SECOND ANNUAL MEETING.

The second annual meeting of the Pharmaceutical Association of the Province of Quebec, incorporated by Act of Parliament, took place in the Laval University yesterday, May 23rd, the President, Nathan Mercer, Esq. (of the firm of Evans, Mercer & Co., Montreal), in the chair. There were present, Messrs. John Kerry, (Kerry Bros. and Crathern, Montreal), E. Giroux, second Vice-President, J. R. Richardson, E. Muir, Secretary, Montreal, J. Goulden, Treasurer, Montreal, W. H. Laroche, Quebec, Roderick McLeod, Quebec, Alexander Manson, (Lymans, Clare & Co., Montreal), A. Leclerc, W. E. Brunet, R. Dugal, L. S. Huot, J. E. Burke, Quebec.

The President, in opening the meeting, said that in accordance with the charter, which provided that the annual meetings should be alternately in Quebec and Montreal, he had great pleasure in meeting his Quebec friends on this occasion, but it was not the first time that they had had the pleasure of discussing pharmaceutical questions with these gentlemen. He believed, however, it was the first occasion that an official meeting of a pharmaceutical association had been held here. The business of the day was mainly of a formal character, but he trusted that the expressions of opinion on the occasion would tend to general good. In a province of such vast extent as ours, where chemists were so widely separated, it was desirable that the utmost advantage should be taken of the only opportunity in the year to express opinions, glean new ideas, learn new facts, and renew the zeal and stimulate the energy of each and every one. Mr. Mercer described the origin and growth of the Association, which had sprung from a Society of Chemists formed in Montreal, for mutual improvement. This Society supplied a long felt want. There had long been felt in the Pro-

vince a dissatisfaction with the position of Pharmacy and a great desire in the minds of junior members for increased educational facilities. The great difficulty with which they had to contend was the manner in which chemists were legislated for, without their consent, and almost without their knowledge. Before entering business they were required to pass an examination before a Board which had no practical experience of a Pharmaceutical business. We wish to provide an education which shall be specially adapted to qualify pharmaceutists for their daily duties. We have established this association for which we have obtained a Charter of Incorporation, we have organized a Board of Examiners, and have encouraged the delivery of a course of lectures to our juniors. Our examinations, however, are not compulsory, and therefore few have as yet availed themselves of the means placed within their reach, but we must persevere, and it was to be trusted that the Association should soon obtain the object in view, namely, to obtain from Parliament a transfer of the examining power of the College of Physicians and Surgeons to their own Board. It was most desirable that this transfer be made with the full concurrence and approval of the physicians. There was no antagonism between the two interests; medicine and pharmacy ought to be united in friendly co-operation, and he was convinced that when it was seen they were in earnest in their endeavors to elevate the profession and protect the public against accidents, by a higher standard of education, they shall have their support in asking the Legislature to invest them with the necessary authority. This has already been done in Ontario, and he might say, without fear of contradiction, that the pharmaceutists of Quebec were as highly educated and as fully competent to be entrusted with such powers as their western brethren. But the fact must not be concealed that before they could hope to obtain legislative recognition they must show themselves alive to the responsibilities which would be placed upon them. Comparatively speaking they were not a large body; their numbers were rapidly increasing every year, and, therefore, it is the more important that every one of them should exert himself to the utmost, for the honor and credit of the body to which he belongs, for the estimation in which they were publicly held would be materially increased by the success of their efforts to obtain a higher standard of efficiency. He would not detain them longer; the Secretary and Treasurer would read their reports, and when they next met, they would feel that the present conference had borne good fruit.

Mr. E. Muir, Secretary, then read the minutes of the last annual meeting, held in Montreal, which were confirmed and adopted.

The annual report of the Council was then read. The progress made since the last annual meeting, justified the Council in stating that the Society was now in complete working order, and in a position to carry out the objects contemplated by its founders—the power of regulating the education and testing the qualifications of their own body, and providing the public with qualified dispensers of medicine. There were now on the register of the association 81 members and 20 associates. Admission could only be obtained to the assocation by those who had gone through the regular course of study, and possessed the necessary qualifications required by the charter of incorporation. The leading feature of the year had been the establishment of a Board of Examiners, Messrs. Ambrosse, Gray, Brunet, Manson and Savage being elected to form the Board and frame the necessary regulations. The first examination was held in the month of November, in Montreal, when 11 young men presented themselves, of whom 7 successfully passed. Their

qualifications were tested in Chemistry, Materia Medica and Botany, the reading and translation of physicians' prescriptions, composition and doses of medicines, the leading tests and antidotes for the most powerful poisons, and the practical dispensing of prescriptions. In addition to a *viva voce* examination, a number of questions had to be answered in writing. Attention was especially called to the opportunity for apprentices joining the Association by having their proficiency in English, French, Latin, and Arithmetic, tested either by appearing personally before the Board, or by sending in a satisfactory certificate from their school master or other persons competent of judging. It was to be hoped that each member taking an apprentice would see that he qualifies as an associate, for not only is it their own interest to do so, but the safety of the public demanded that no youth should enter the profession who did not possess a liberal education. The report gave a full account of the working of the College of Pharmacy of Montreal, and a sketch of its origin and history. It had its origin in the necessities of the profession, and was the result of the formation of a local chemists' society; it was now permanently established, and in active operation. The Council hoped the members of the Association resident in Quebec city would also form a local society; there was plenty of material in the Ancient Capital, and the successful working of the sister societies, in Quebec and Montreal, could not fail to have a beneficial effect in the advancement of Pharmacy in the whole Province. Comparing the position of the Province with what it was before the Charter was obtained, it could not but be seen that an important advance had been made, and the influence of the Association had made itself felt, and the position of its members raised by the determination shewn to raise the standard of Pharmaceutical education. It is to be hoped that the day is not far distant when the Legislature shall see fit to vest the Pharmaceutical Association with such powers as will render it necessary that every person who undertakes the dispensing of prescriptions shall possess its diploma, as a guarantee to the public that he has the necessary qualification and skill.

The Treasurer's statement showed a balance in hand of $72.09.

It was Moved by E. Giroux, Esq., seconded by John Kerry, Esq., that the Reports be received, printed and distributed among the members. Carried.

Mr. Kerry had very much pleasure in seconding the report though he was sorry Mr. Giroux had not spoken. The motion had only been put into his hands a few moments before, and he had really very little to say. There was one thing strikingly satisfactory about the report, and that was the list of membership. The financial statement showed that they were solvent; considering the expense of going to the legislature for an act of incorporation, and the balance was very handsome. He had frequently the pleasure of meeting his Quebec friends when down here trying to have the act making them an incorporated body passed, and he had much to say in their favor. He trusted that the Quebec chemists, moved by the onward spirit of the age, would not be content to stay where they were. He hoped the expressions of opinion on the occasion would give the Council confidence to move for legislative powers to place the Association on that footing which it must eventually hold. The suggestion in the report that the Quebec chemists should form an affiliated association with that of Montreal was a good one. The Society in Montreal has been felt to be a great power for the advancement of the profession. If these gentlemen saw fit to adopt such a course it would do good, not only to the Association in Montreal, by inducing educational rivalry, but serve also to put the Society on a firmer basis of public respect.

Mr. Alexander Manson said that as to the formation of a society in Quebec, he thought the object of their visit would not be lost to-day if nothing else was done than meeting with friends and enjoying the interchange of ideas. He thought that by such means they could go to work with stronger hands, and with the sympathy of the entire profession of the Province of Quebec. He thought all efforts at advancement were strengthened by the knowledge that in working the confidence of all concerned was secured.

Mr. Dugal, on behalf of the chemists of Quebec, returned thanks for the very kind expressions which had been uttered. The doings of the day would not be lost upon them, nor would the suggestions be thrown away. So far as he was concerned he should do all in his power to forward the objects of the Association. The election of a new council was then proceeded with, the President nominating Messrs. E. Muir and Giroux, scrutineers.

Mr. J. E. Burke, seconded by Mr. W. H. Laroche, moved a vote of thanks to the retiring officers, which was carried by acclamation.

Mr. Manson, seconded by Mr. Goulden, moved a vote of thanks to the Rector of the University for granting so kindly the use of the rooms of the University for the purpose of the meeting.

The Scrutineers then returned and declared the following gentlemen elected members of the Council for the ensuing year:—

Messrs. John Kerry, H. R. Gray, Alex. Manson, Jas. Goulden, H. Lyman, J. D. L. Ambrosse, A. Picault, C. L. Covernton, W. Mercer, E. Muir, E. Giroux, W. E. Brunet.

A vote of thanks was then passed to the President.

The following gentlemen were elected members:—L. J. Huot, Roche Dugal, F. E. Gauvreau, J. R. Richardson, M.D., J. E. Burke, R. McLeod, J. J. Veldon, W. Ahern.

The Association then visited the Rev. Rector, and presented a vote of thanks; viewed the University in its different departments, and adjourned to the St. Louis Hotel, where lunch was partaken of.

BUSINESS MEMORANDA.

Mr. Robert Wade, who for the past two years has been managing the Branch establishment of A. V. Palmer, at Angus, has been admitted as partner into Mr. Palmer's business at Barrie. We believe the style of the new firm is Palmer & Wade.

Mr. Archdale Wilson, partner in the late firm of Wilson & Co., Hamilton, has purchased the interest of T. Bickle & Son in said firm, and now carries on the business alone, under the style Archdale Wilson & Co.

The partnership existing between Messrs. Barker & Auston of Brighton has, by mutual consent, been dissolved. Mr. Barker continues.

The business at Hamilton formerly conducted by Messrs. Holbrook & Stark is now continued by Mr. Wm. G. Stark.

Drugs, Medicines, &c.	$ c.	$ c.
Acid, Acetic, fort	0 12	@ 0 14
Benzoic, pure	0 25	0 35
Citric	1 15	1 20
Muriatic	0 04	0 06
Nitric	0 11¼	0 15
Oxalic	0 35	0 35
Sulphuric	0 03¾	0 07
Tartaric, pulv	0 50	0 50
Ammon, carb. casks	0 21	0 22
" jars	0 21	0 22
Liquor, 880	0 20	0 25
Muriate	0 12½	0 15
Nitrate	0 45	0 60
Æther, Acetic	0 45	0 50
Nitrous	0 35	0 37
Sulphuric	0 48	0 50
Antim. Crude, pulv	0 13	0 17
Tart "	0 56	0 60
Alcohol, 95 per ct.	Cash 1 60	1 72
Arrowroot, Jamaica	0 18	0 22
Bermuda	0 45	0 65
Alum	0 02¾	0 03½
Balsam, Canada	0 40	0 42
Copaiba	0 77	0 80
Peru	3 80	4 00
Tolu	0 00	1 00
Bark, Bayberry, pulv	0 18	0 20
Canella	0 17	0 20
Peruvian, yel. pulv	0 42	0 50
" red "	2 10	2 20
Slippery Elm, g. b	0 15	0 20
" flour, packets	0 28	0 32
Sassafras	0 12	0 15
Berries, Cubebs, ground	0 20	0 25
Juniper	0 06	0 10
Beans, Tonquin	0 62	1 10
Vanilla	18 00	19 00
Bismuth	4 00	5 00
Carb.	4 00	5 00
Camphor, Crude	0 38	0 40
Refined	0 50	0 55
Cantharides	2 90	3 00
Powdered	3 00	3 10
Charcoal, Animal	0 04	0 06
Wood, powdered	0 10	0 15
Chiretta	0 20	0 30
Chloroform	1 25	1 65
Cochineal, S. G	0 80	0 95
" Black	1 10	1 20
Coccoynth, pulv	0 50	0 60
Collodion	0 67	0 70
Elaterium	oz 4 50	5 00
Ergot	0 65	0 75
Extract Belladonna	2 20	2 50
Colocynth, Co	1 25	1 75
Gentian	0 50	0 60
Hemlock, Ang	1 12	1 25
Henbane, "	1 70	2 00
Jalap	5 00	5 50
Mandrake	1 75	2 00
Nux Vomic	oz 0 60	0 70
Opium	oz 1 10	—
Rhubarb	7 50	—
Sarsap. Hon. Co	1 00	1 20
" Jam. Co	3 25	3 70
Taraxicum, Ang	0 70	0 80
Flowers, Arnica	0 25	0 35
Chamomile	0 30	0 40
Gum, Aloes, Barb. extra	0 70	0 80
" " good	0 38	0 50
" Cape	0 12	0 20
" " powdered	0 20	0 30
" Socot	0 76	80
" " pulv	0 90	00
Arabic, White	0 60	0 65
" " powdered	0 50	0 55
" sorts	0 28	0 30
" " powdered	0 22	0 50
" com. Gedda	0 13	0 16
Assafœtida	0 32	0 35
British or Dextrine	0 13	0 15
Benzoin	0 48	0 55
Catechu	0 12	0 15
" powdered	0 25	0 30
Euphorb, pulv	0 32	0 40
Gamboge	1 05	1 20
Guaiacum	0 25	0 28
Myrrh	0 42	0 60

Drugs, Medicines, &c.—*Contd.*	$ c.	$ c.
Sang Dracon	0 60	0 70
Scammony, powdered	6 50	6 75
" Virg. "	14 50	—
Shellac, Orange	0 55	0 60
Gum, Shellac, liver	0 50	0 52
Storax	0 65	0 75
Tragacanth, flake	1 10	1 40
" common	0 35	0 40
Galls	0 27	0 32
Gelatine, Cox's 6d	1 10	1 20
Glycerine, common	0 30	0 35
Vienna	0 30	0 40
Prices	0 60	c 75
Honey, Canada, best	0 15	0 17
Lower Canada	0 14	0 16
Iron, Carb. Precip	0 17	0 20
" Sacchar	0 40	0 55
Citrate Ammon	1 45	1 50
" & Quinine, oz	0 56	0 60
" & Strychine "	0 17	0 25
Sulphate, pure	0 08	0 10
Iodine, good	12 50	—
Resubiimed	16 25	—
Jalapin	1 40	1 60
Kreosote	1 60	1 70
Leaves, Buchu	0 25	0 30
Foxglove	0 25	0 30
Henbane	0 35	0 40
Senna, Alex	0 30	0 60
" E. I.	0 12½	0 20
" Tinnevilly	0 20	0 30
Uva Ursi	0 15	0 15
Lime, Carbolate	brl 5 50	—
Chloride	0 06	0 07
Sulphate	0 08	0 12½
Lead, Acetate	0 14	0 15
Leptandrin	oz. 0 60	—
Liq. Bismuth	0 50	0 75
Lye, Concentrated	1 75	2 00
Liquorice, Solazzi	0 50	0 55
Cassano	0 23	0 40
Other brands	0 14	0 25
Liquorice, Refined	0 35	0 45
Magnesia, Carb	1 oz. 0 20	0 25
"	4 oz. 0 17	0 20
Calcined	0 65	0 75
Citrate	gran. 0 45	0 50
Mercury	1 00	1 15
Bichlor	1 00	—
Chloride	1 25	—
C. Chalk	0 60	—
Nit. Oxyd	1 25	—
Morphia Acet	3 65	4 00
Mur.	3 65	4 00
Sulph	3 80	4 20
Musk, pure grain	oz 22 00	—
Canton	0 90	1 20
Oil, Amonds, sweet	0 50	0 52
" bitter	14 00	15 00
Aniseed	4 25	4 50
Bergamot, super	5 75	6 00
Carraway	4 00	4 20
Cassia	2 20	2 50
Castor, E. I	0 15	0 15
Crystal	0 22	0 25
Italian	0 26	0 28
Citronella	1 15	1 50
Cloves, Ang	1 15	1 30
Cod Liver	1 00	1 50
Croton	2 00	2 10
Juniper Wood	0 80	1 00
Berries	6 00	7 00
Lavand, Ang	oz. 0 90	1 00
Exotic	1 40	1 60
Lemon, super	5 75	6 00
ord	3 20	3 40
Orange	4 00	4 25
Origanum	0 65	0 75
Peppermint Ang	13 00	14 40
" Amer	3 25	3 50
Rose, Virgin	6 50	7 00
" good	5 00	5 50
Sassafras	1 15	1 40
Wintergreen	6 00	6 50
Wormwood, pure	4 00	6 50
Ointment, blue	0 76	0 80
Opium, Turkey	6 50	6 75
pulv	9 00	10 00

DRUGS, MEDICINES, &c.—*Cont'd*	$ c.	$ c
Orange Peel, opt.	0 30	0 36
" good	0 12½	0 20
Pill, Blue, Mass	0 80	0 85
Potash, Bi.chrom	0 23	0 27
Bi-tart	0 30	0 32
Carbonate	0 14	0 20
Chlorate	0 65	0 70
Nitrate	10 50	11 00
Potassium, Bromide	1 60	1 75
Cyanide	0 75	0 80
Iodide	11 75	0 00
Sulphuret	0 25	0 35
Pepsin, Boudault's...oz	1 50	—
Houghton's..... doz.	8 00	9 00
Morson's.....oz.	0 85	1 10
Phosphorus	0 75	0 85
Podophyllin	0 50	0 60
Quinine, Pelletier's	—	2 25
Howard's	2 35	—
" 100 oz. case.	2 35	—
" 25 oz. tin..	2 30	—
Root, Colombo	0 13	0 20
Curcuma, grd	0 12½	0 17
Dandelion	0 25	0 35
Elecampane	0 14	0 17
Gentian	0 10	0 12½
" pulv	0 15	0 20
Hellebore, pulv	0 17	0 20
Ipecac, "	2 20	2 30
Jalap, Vera Cruz	1 10	1 25
" Tampico	0 90	1 00
Liquorice, select	0 12	0 13
" powdered	0 15	0 20
Mandrake "	0 20	0 25
Orris, "	0 20	0 25
Rhubarb, Turkey	3 50	—
" E. I	1 10	2 00
" " pulv	1 40	2 50
" " 2nd	1 30	1 50
" French	0 75	—
Sarsap., Hond	0 40	0 45
" Jam	0 88	0 90
Squills	0 10	0 15½
Senega	1 35	1 50
Spigelia	0 40	0 45
Sal., Epsom	2 25	3 00
Rochelle	0 30	0 35
Soda	0 02½	0 03
Seed, Anise	0 13	0 16
Canary	0 05	0 06
Cardamon	3 50	2 00
Fenugreek, g'd	0 09	0 10
Hemp	0 06½	—
Mustard, white	0 14	0 16
Saffron, American	2 00	2 50
Spanish	16 00	17 00
Santonine	9 00	10 00
Sago	0 07½	0 09
Silver, Nitrate.....Cash	14 85	16 50
Soap Castile, mottled	0 10	0 14
Soda Ash	0 04	0 05
Bicarb. Newcastle	6 00	6 25
" Howard's	0 14	0 16
Caustic	0 05½	6 00
Spirits Ammon., arom	0 25	0 35
Strychnine, Crystals	2 20	2 50
Sulphur. Precip	0 10	0 12½
Sublimed	0 03½	0 05
Roll	0 03	0 03½
Vinegar, Wine, pure	0 55	0 60
Verdigris	0 35	0 40
Wax, White, pure	0 75	0 80
Zinc. Chloride.....oz	0 10	0 15
Sulphate, pure	0 10	0 15
" common	0 06	0 10
DYESTUFFS.		
Annatto	0 35 @	0 60
Analine, Magenta, cryst	3 00	4 00
" liquid	2 00	—
Argols, ground	0 15	0 25
Blue Vitrol, pure	0 09	0 10
Camwood	0 08	0 09
Copperas, Green	0 01½	0 02½
Cudbear	0 16	0 25
Fustic, Cuban	0 02½	0 04
Indigo, Bengal	2 40	2 50
Madras	0 95	1 10
Extract	6 28	0 35

DYESTUFFS—*Continued.*		
Japonica	0 05½	0 06½
Lacdye, powdered	0 33	0 38
Logwood	0 02	0 03
Logwood, Camp	0 02	0 3½
Extract	0 10	0 14
" 1 lb. bxs	0 14	—
" ½ lb. "	0 15	—
Madder, best Dutch	0 16	0 17
2nd quality	0 15	0 16
Quercitron	0 03	0 05
Sumac	0 06	0 08
Tin, Muriate	0 10½	0 12½
Redwood	0 05	0 06
SPICES.		
Allspice	0 8½@	0 10
Cassia	0 38	0 40
Cloves	0 15	0 16
Cayenne	0 18	0 25
Ginger, E. I	0 12	0 14
Jam	0 20	0 30
Mace	1 45	1 75
Mustard, com	0 20	0 25
Nutmegs	1 05	1 10
Pepper, Black	0 22½	0 23
White	0 40	0 42
PAINTS, DRY.		
Black, Lamp, com	0 07 @	0 08
" refined	0 25	0 30
Blue, Celestial	0 08	0 12
Prussian	0 65	0 75
Brown, Vandyke	0 10	0 12½
Chalk, White	0 01	0 01½
Green, Brunswick	0 07	0 10
Chrome	0 16	0 25
Paris	0 30	0 35
Magnesia	0 20	0 25
Litharge	0 07	0 09
Pink, Rose	0 12½	0 15
Red Lead	0 07	0 08
Venetian	0 02½	0 03½
Sienna, B. & G	0 10	0 15
Umber	0 07	0 10
Vermillion, English	1 20	1 25
American	0 25	0 35
Whiting	0 85	0 90
White Lead, dry, gen	0 08	0 09
" " No. 1	0 07	0 08
" " No. 2	0 05	0 07
Yellow Chrome	0 12½	0 35
" Ochre	0 02½	0 03½
Zinc White, Star	0 10	0 12
COLORS, IN OIL.		
Blue Paint	0 12 @	0 15
Fire Proof Paint	0 06	0 08
Green, Paris	0 30	0 37½
Red, Venetian	0 07	0 10
Patent Dryers, 1 lb tins	0 11	0 12
Putty	0 03½	0 04½
Yellow Ochre	0 08	0 12
White Lead, gen. 25 lb. tins	2 30	—
" No. 1	2 10	—
" No. 2	1 90	—
" No. 3	1 65	—
" com	1 30	—
White Zinc, Snow	2 75	3 25
NAVAL STORES.		
Black Pitch	5 50 @	5 60
Rosin, Strained	5 25	5 25
Clear, pale	9 00	10 00
Spirits Turpentine	0 85	90
Tar Wood	5 00	5 25
OILS.		
Cod	0 60 @	0 62
Lard, extra	1 00	—
No. 1	0 95	1 00
No. 2	0 85	0 90
Linseed, Raw	0 77½	0 80
Boiled	0 82½	0 85
Olive, Common	1 15	1 35
Salad	1 80	2 30
" Pints, cases	4 20	4 40
" Quarts	3 60	3 00
Seal Oil, Pale	0 75	0 80
Straw	0 70	0 75
Sesame Salad	1 30	1 35
Sperm, genuine	2 35	2 40
Whale, refined	0 90	0 95

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1867. JUROR, 1862.

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Contains the active digestive principle of the gastric juice of the stomach, purified and rendered permanent and palatable. Dose—15 to 20 grains. In 1 oz. bottles.

MORSON'S PEPSINA PORCI,
Dose, 5 to 10 Grains.

Every Bottle or Box containing the Preparations named, and bearing the Trade Mark of T. Morson & Son, *but not otherwise*, is sold with such guarantee.

PEPSINE GLOBULES (each containing 5 grains of pure Pepsine).
" " in Bottles, each containing 1, 2, and 4 dozen Globules.
" LOZENGES, in boxes.
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These Preparations bearing the Trade Mark, *but not otherwise*, will be guaranteed to possess the full efficacy of the digestive principle.

PANCREATIC EMULSION, and PANCREATINE in powder, containing the active principle obtained from the Pancreas, by which the digestion and assimilation of fat is effected.

PANCREATINE POWDER, in 1 oz. Packets. PANCREATIC EMULSION, in bulk for dispensing; also in 4, 8, and 16 oz. Stoppered Bottles.

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The combination of Chloroform quickly relieves the pain and spasms of Cholera, Diarrhœa, Dysentery, and in fact all acute and nervous pains, and chronic coughs, frequently very small doses will produce this beneficial result. It may be administered in almost any fluid or on sugar.

Many of the chlorodynes of commerce are not of uniform strength, and vary in their effect, which has induced MORSON & SON to compound this preparation to remedy these defects.

The dose for an adult is from 10 to 20 drops (and 1 minim is equal to 2 drops), the dose may, however, be increased in especial cases to 25 or even 30 minims, but is best to commence with the lesser dose.

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Darley's Black Oil.
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Labels and Directions,
Glassware and Earthenware,
Colors—Dry and in Oil,
Naval Stores,
Spices,
Garden Seeds,
Perfumery,
Soaps,
Pharmaceutical Books,
Shop Furnishing Ware,
Corks,
White Lead,
Oils, Varnishes.

AND EVERY REQUISITE OF THE RETAIL DRUG TRADE.