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"Je prends le bien où je le trouve."

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1861.
FIRST REPORT TO THE "COTTON PLANTERS' CONVENTION" OF GEORGIA.

On the Tertiary Lime Formation of Georgia, by Joseph Jones, M. D., Professor of Chemistry in the Medical College of Georgia, and Chemist of the Cotton Planters' Association.

(CONTINUED.)

From these several analyses of the rocks from which these valuable wheat soils have been derived, it will be observed—

First, Lime enters largely into their composition. The lime is found in combination with sulphuric acid, carbonic acid and phosphoric acid, and with chlorine. The sulphate of lime appears to be derived principally from the beds of gypsum, which are found amongst the shales.

Second, Magnesia is an important and constant constituent of the shales and limestones. These observations in New York demonstrate that this element, when not in the caustic condition, but combined with carbonic and other acids exerts beneficial influences upon cereals. Observations upon the influence of dolomites (limestones containing a large amount of carbonate of magnesia) in Berkshire, Massachusetts, in England, and in other countries, demonstrate the correctness of the conclusion
that magnesia saturated with carbonic acid gas is not injurious to vegetation.

Third. These rocks contain all the salts of soda and potassa, as well as those of lime and magnesia, necessary for vegetables and animals.

Fourth. These rocks also contain organic matters which are supposed to have been derived from the plants and animals which lived at the period of the deposition of these rocks.

According to the returns of the wheat crop of New York from 1844 to 1845, the soils resulting from the decomposition of the older and harder rocks, as those of the Taconic and Hudson and Mowhawk districts, yielded only from 8 to 9½ bushels to the acre, whilst the soils of the western and central wheat district yielded on an average 15½ bushels to the acre. The differences in the yield of the lands in these regions have been shown by Professor Emmons to be due to differences in the physical and chemical constitution of the soil, and to differences of the chemical and physical constitution of the rocks from which they have been derived.

We might multiply examples to show that a deficiency of lime causes sterility, whilst its abundance promotes fertility. The following examples, however, in addition to those which we have just recorded, will be sufficient to place the question of the value of lime beyond all doubt or dispute.

Long Island, if we except the drift upon its northern slope, or that which faces the sound, has been recovered from the ocean—it is based upon a reef of rocks upon which sand has been washed up by the waves, the soil is therefore composed almost entirely of washed sand, which is exceedingly porous, and contains but little lime. It yields but poor returns to the agriculturist, unless highly manured. The sea islands upon the sea coast of Georgia have a similar constitution to Long Island, but they are in many cases more productive, on account of the vast number of shells deposited upon them by the Indians, and left upon the surface after the last elevation of the Atlantic coast.
The soil from Schodack, New York, the analyses of which are recorded in the table, contains only a trace of lime and magnesia, is a very poor soil and is soon exhausted by culture.

In Smithfield, Rhode Island, a very luxuriant soil has resulted from the mixture of the detritus of hornblende rock and limestone. The effects of lime in rendering this soil fertile, is demonstrated by the fact that white and red clover, and other sweet grasses spring up upon it as they would do upon carefully limed soils.* The tertiary soils of Rhode Island, on the other hand, are wanting in vegetable matter and lime, and are correspondingly poor and easily exhausted.

The Black Jack lands of York and Chester, South Carolina, which have resulted from the decomposition of porphry, and which contain, according to the analysis of Professor Tuomey, near three per cent. of carbonate of lime, and an appreciable amount of soda and potassa, prove, when properly drained and cultivated, to be equal to the best grain lands in the State of South Carolina.

From the disintegration of "rotten limestone" are produced the richest prairie soils of the counties of Green, Sumpter and Marengo, in Alabama.

In a still farther examination of these tables, the next fact which strikes our attention is:

(b.) The proportion of Sand and Clay varies greatly in different soils.

The texture of soils depends in great measure upon the proportions of sand and clay.

Pure sand forms a soil without any tenacity. The effects of manures speedily vanish upon sandy soils.

Pure clay forms a soil of the greatest tenacity, and a soil which is with difficulty drained.

It would be important and interesting to consider these properties of soils in their relations to drainage, but we must defer the thorough discussion of this subject to the

Jackson's Agricultural Report on Rhode Island, p. 128.
report upon the soils of Georgia, and confine our attention to their relations to lime.

The texture of the soil has important bearings upon the action of lime, and determines in a great measure the amount which should be applied.

And here again a knowledge of the chemical constitution of the rocks from which the soil has been derived is of great importance. The proportion of hard insoluble coarse particles in soils which are generally denominated sand, differ both in physical and chemical characters, according as the rocks from which they have been derived differ in these characters. Thus, we may have a coarse or a fine sand. Thus in the highland or primary districts of New York, the soil is coarse and the quantity of finely divided matter is evidently deficient, because derived from hard rocks which decompose slowly; whilst the soils derived from the Taconic rocks are finer than those of the Primary, and contain a greater proportion of finely divided matter, and yet they are inferior in fineness of division, from the soils of central and western New York, which have been derived from Sedimentary rocks of a newer date, which are still more rapidly decomposed. That texture alone will influence the fertility of a soil, might be illustrated by numerous examples; the following well established facts will, serve to show the effects of division: Soils composed almost entirely of coarse sand silex, allow the salts applied to enrich the soil to be washed out by the rains, and both their capillary power for fluids, and their absorbent power for gases are weak. The power of such soils to absorb moisture, and ammonia, and other gases from the soil, and to draw up by capillary attraction the water from beneath will be greatly increased by comminution or by adding some material which will absorb readily moisture, which will decompose the coarse particles, and thus give tenacity to the soil. Now lime is precisely the substance which accomplishes these effects.

It has been calculated by Professor Leslie that in a soil
of gravel, the pores of which are 1-100th of an inch in diameter, water will ascend in these pores by capillary attraction not more than four inches; whilst if the coarse sand have interstices of only 1-500th of an inch, water will rise through a bed of this sand sixteen inches; and if the pores be still farther diminished to the 1-10000th part of an inch, water will rise in such minute capillary tubes twenty-five and a half feet. The effect of the addition of lime to the soil is to diminish the size of its pores, and thus increase its power of capillary attraction.

The effect of fine division upon gases is well shown in the case of spongy platinum—if a solid piece of ordinary platinum be plunged in a stream of hydrogen gas no effect whatever will be produced; whilst if finely divided platinum be plunged in the hydrogen, it will condense the gas with such rapidity that it will become red hot, and inflame the gas almost instantaneously. In our own bodies the great changes of life take place in the delicate capillaries and in the minute blood corpuscles, not more than the 1-3000th part of an inch in diameter. Division promotes contact, and close contact allows the play of those molecular forces which act only at infinitely small distances, and the greatest of these forces, which can alone be excited by close contact is chemical affinity, which generates electricity, and is the great force in all animal and vegetable existence. Chemical action is inseparable from activity upon our globe—it is the great source of force in animals, and whether excited by the sun or by the secondary electrical forces generated in the bowels of the earth, it is the great force upon which vegetation absolutely depends.

The following table will present a condensed view of many of the important physical relations of Lime to Soils:
Table 29. Illustrating the physical properties of various Soils. Drawn up from the experiments of M. Schubler.

<table>
<thead>
<tr>
<th>KIND OF SOIL</th>
<th>Consistency Tenacity or Frailty of Soils</th>
<th>Shrinking of Soils during drying</th>
<th>Imbibition of Water by Soils</th>
<th>Disposition of Soils to become dry</th>
<th>Hygroscopic power of Soils. 77.105 grains troy. of soil spread upon a surface of 141.3 square inches absorbed in</th>
<th>Capacity of Soils for Heat</th>
<th>Degrees in which Soils become heated under exposure to the Sun.</th>
<th>Degrees Centigrade.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silicious Sand,</td>
<td>0.0</td>
<td>100</td>
<td>25</td>
<td>88.4</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>95.6</td>
</tr>
<tr>
<td>Calcareous Sand,</td>
<td>0.0</td>
<td>100</td>
<td>29</td>
<td>75.9</td>
<td>0.154</td>
<td>0.231</td>
<td>0.231</td>
<td>100.0</td>
</tr>
<tr>
<td>Fine Calcareous Earth</td>
<td>5.0</td>
<td>100</td>
<td>82</td>
<td>25.0</td>
<td>2.062</td>
<td>2.659</td>
<td>2.659</td>
<td>61.8</td>
</tr>
<tr>
<td>Gypsum</td>
<td>7.3</td>
<td>100</td>
<td>97</td>
<td>0.77</td>
<td>0.077</td>
<td>0.077</td>
<td>0.077</td>
<td>73.2</td>
</tr>
<tr>
<td>Humus</td>
<td>5.6</td>
<td>100</td>
<td>86</td>
<td>30.5</td>
<td>0.460</td>
<td>0.470</td>
<td>0.470</td>
<td>49.0</td>
</tr>
<tr>
<td>Sandy Clay,</td>
<td>7.3</td>
<td>100</td>
<td>90</td>
<td>53.0</td>
<td>2.310</td>
<td>3.080</td>
<td>3.080</td>
<td>65.4</td>
</tr>
<tr>
<td>Miff Clayey Soil,</td>
<td>6.8</td>
<td>100</td>
<td>90</td>
<td>31.9</td>
<td>2.349</td>
<td>3.234</td>
<td>3.234</td>
<td>66.7</td>
</tr>
<tr>
<td>Silt Clay</td>
<td>53.3</td>
<td>100</td>
<td>30</td>
<td>23.3</td>
<td>2.322</td>
<td>3.771</td>
<td>3.771</td>
<td>70.1</td>
</tr>
<tr>
<td>Fine Clay</td>
<td>100.0</td>
<td>100</td>
<td>30</td>
<td>40.1</td>
<td>1.675</td>
<td>1.540</td>
<td>1.540</td>
<td>74.4</td>
</tr>
<tr>
<td>Garden Earth</td>
<td>22.0</td>
<td>90.5</td>
<td>48</td>
<td>38.0</td>
<td>8.0.0</td>
<td>8.0.0</td>
<td>8.0.0</td>
<td>43.76</td>
</tr>
<tr>
<td>Arable Earth from Hoxley,</td>
<td>22.0</td>
<td>90.5</td>
<td>48</td>
<td>40.1</td>
<td>1.675</td>
<td>1.540</td>
<td>1.540</td>
<td>74.4</td>
</tr>
<tr>
<td>Arable Earth from the Jur,</td>
<td>22.0</td>
<td>90.5</td>
<td>48</td>
<td>40.1</td>
<td>1.675</td>
<td>1.540</td>
<td>1.540</td>
<td>74.4</td>
</tr>
<tr>
<td>Carbonate of Lime in fine powder,</td>
<td>22.0</td>
<td>90.5</td>
<td>48</td>
<td>40.1</td>
<td>1.675</td>
<td>1.540</td>
<td>1.540</td>
<td>74.4</td>
</tr>
</tbody>
</table>

Highest temperature acquired by the upper larger, the mean temperature of the atmosphere being 25 C. (77 Fhr.)

<table>
<thead>
<tr>
<th>Moist Soil.</th>
<th>Dry Soil.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degrees Centrigrade.</td>
<td>Degrees Centrigrade.</td>
</tr>
<tr>
<td>37.25 (90o F.)</td>
<td>44.75 (112o F.)</td>
</tr>
<tr>
<td>37.25 (90o F.)</td>
<td>44.75 (112o F.)</td>
</tr>
<tr>
<td>38.63 (96+1F.)</td>
<td>45.06 (100+4F.)</td>
</tr>
<tr>
<td>39.25</td>
<td>45.62</td>
</tr>
<tr>
<td>39.75 (103+3F.)</td>
<td>45.37</td>
</tr>
<tr>
<td>39.75</td>
<td>45.37</td>
</tr>
<tr>
<td>44.5</td>
<td>44.5</td>
</tr>
<tr>
<td>44.42</td>
<td>44.42</td>
</tr>
<tr>
<td>38.78</td>
<td>44.62</td>
</tr>
<tr>
<td>37.50</td>
<td>45.80</td>
</tr>
<tr>
<td>37.50</td>
<td>45.80</td>
</tr>
<tr>
<td>36.88</td>
<td>44.25</td>
</tr>
<tr>
<td>36.50</td>
<td>43.76</td>
</tr>
</tbody>
</table>
From a careful comparison of these results, the following conclusions, bearing more directly upon the employment of Calcareous manures in agriculture may be drawn:

First: The tenacity of fine calcareous earth is less than one-tenth of that of sandy clay soil, less than one-twelfth of stiff clay soil, less than one-sixteenth of the tenacity of stiff clay, and twenty times less than the tenacity of pure clay.

The tenacity of calcareous earth is less than one-fourth the tenacity of arable land, and approaches more nearly to that of Hunns, and of the richest and best garden earth.

In wet weather stiff clay lands, on account of the rapidity and extent with which they absorb, and the obstinacy with which they retain water, are soon converted into a stiff cohesive mud, which is worked with great trouble and difficulty on account of the increased tenacity. In long continued dry weather, stiff clay lands on account of the extent to which they contract and of the consequent increase of their tenacity, not only become so hard that they are with difficulty worked, but the roots of corn and cotton and of all vegetables penetrate the hard dry soil with great difficulty, and are greatly exposed and injured by the shrinking and cracking of the clay during drying. Not only theory and philosophical experiments performed in the Laboratory, but more especially practical agricultural experience, demonstrate in the clearest and most indisputable manner, that the addition of marl and of calcareous manures generally to clay soils, diminishes their tenacity in both wet and dry weather, counteracts the tendency to shrink and crack during dry weather, and thus renders them more easy of cultivation, and more suitable to sustain vegetation.

Second: Inasmuch as calcareous earth absorbs water far more rapidly and to a much greater extent, and retains it much more tenaciously than sandy soils, and than even good arable land, it is evident that the addition of marls and calcareous manures generally to sandy lands will increase the power of absorbing and of retaining water, and
Tertiary Lime Formation

thus remedy a most prominent and injurious defect in this class of soils. Here again the results of experiment and the deductions of reason, correspond with those of actual agricultural experience.

Third: The Hygrometric power of calcareous earth, is not only far greater than that of sand and sandy soils, but it is nearly twice as great as that of good arable land. The ability to absorb moisture readily from the atmosphere is a most valuable property in its relations to the germination and development of the vegetable kingdom. The moisture in the atmosphere contains not only water, which enters so largely into the composition of all plants, but it also contains small quantities of Carbonic Acid gas, Ammonia, and in certain conditions of the atmosphere, Nitric Acid—compounds which play an essential part in the economy of vegetation. It is evident, therefore, that the addition of marls and of calcareous manures to sandy soils, and in fact to almost all arable lands, will increase their fertility, by increasing their power of absorbing water and valuable compounds from the atmosphere.

Fourth: Calcareous earth absorbs heat less rapidly, and is far less subject to variations of temperature than sandy soils, and in fact, even than good arable soils.

The rapidity with which soils allow their water to evaporate influences their temperature, for during the evaporation of the water the thousand degrees required to change the water to the state of vapor, is abstracted principally from the surface of the soil, upon which the evaporation is taking place. It is evident from this fact that soils which retain their moisture with tenacity, and consequently allow their water to escape by evaporation slowly, and at the same time absorb heat slowly and part with it correspondingly slowly, must necessarily possess a far more uniform temperature, and must as a necessary consequence be far more favorable to vegetation than soils which allow of rapid evaporation, and rapid absorption and radiation of heat.
The addition of marls and of calcareous manures, generally to sandy soils will render their temperature more uniform.

A still farther comparison of the results embodied in the tables of the composition of the soils of various countries and States in Europe and America, leads to the observation that soils differ greatly in the proportion of organic matters.

An accurate knowledge of the amounts of organic matter in soils, is essential to the intelligent and successful application of calcaceous manures to land.

The intelligent and successful application of calcaceous manures must depend upon a knowledge of the chemical relations of lime to the inorganic and organic constituents of the soils.

(c) Chemical Relations of Lime to the Inorganic and Organic Constituents of Soils.

The effects of lime upon the constituents of soils are not merely physical effects; as marked and as important as are the physical effects of calcareous manures upon soils, the chemical effects are still more decided and important.

By the following simple experiments, the planter may demonstrate to himself, that lime exerts chemical effects upon manures, soils and rocks.

If lime be mixed with Peruvian Guano there will be produced, almost immediately, a strong smell of Ammonia; the lime has displaced the Ammonia, and combined with the Carbonic Acid and other organic and inorganic acids which had formed with the Ammonia of the Guano, solid compounds; the same effect will be produced by the addition of lime to stable or cow-pen manure. This effect of lime upon the compounds of Ammonia, is exceedingly interesting to the planter, as indicating the impropriety of adding quick lime to manures which contain the valuable ingredient Ammonia.

If we carefully wash out all the soluble matters from manure of any kind, and then add lime, we will obtain, af-
ter allowing the mixture to remain for several hours, an additional amount of soluble matter.

If we place a definite quantity of soil upon a filter, and pass pure water through it until every trace of soluble matter is removed, (which may be determined by evaporating the distilled water after its passage through the soil, in a clear watch glass or silver plate,) and then add to the soil lime, and allow the mixture to remain in a moist state for several days, and again pass distilled water through the mixture, we will obtain an additional portion of soluble matter, together with a portion of the lime which has been rendered soluble by chemical combination with the elements of the soil.

If we boil Felspar, one of the constituents of Granite, which contains the silicates of Potash and Alumina, with water, or even with acids, they will dissolve but little out of it, even after days and weeks; if however, the Felspar be mixed with lime, the alkali Potash may be readily dissolved out by means of acids, and even by water.

These experiments clearly show that when lime is added to the soil it causes chemical changes in both the inorganic and the organic compounds of the soil.

It is important that we should examine more closely the chemical effects of lime upon these two great classes of compounds, which exist in all fertile soils.

(d) Chemical effects of Lime upon the Inorganic Constituents of Soils.

Every fertile soil is composed in large measure of insoluble Silicates, which are commonly called clay. The different varieties of clay, although possessing many properties in common, still differ in chemical constitution, and each variety, although apparently nothing but a plastic mass of a homogeneous simple substance, is in reality composed of several different substances. The varieties of clay will differ with the rocks from which they have been derived, and with the various changes through which they have passed. Thus kaolin or china clay may arise from the decomposition of
the same rock Felspar, under two different conditions; and the kaolin will be different in each case. When felspar, which consists of one atom of the silicate of potash, combined with two atoms of silicate of Alumina, decomposes in a wet or rainy atmosphere, the silicate of potash appear to be simply washed away by the water, and the resulting clay has the composition of three atoms of silica and two atoms of alumina; when however, the felspar decomposes in a moist, but drier atmosphere, the silicate of potash, instead of being entirely washed away, is first decomposed, the silicic acid combines with the silicate of alumina, and the potash escapes as a carbonate, and the clay resulting is composed of four atoms of silica and two of alumina.

There are numerous other minerals which, during their decomposition, afford clay of various constitutions.

To illustrate this important truth to the agriculturist, that clays are composed of a great variety of substances, we have selected as examples three specimens of clay, from one country (the Netherlands) taken from the Zuiderzee, and analyzed by E. H. Von Baumhauer.

We shall, at a subsequent part of this report, present analyses of the Joint clays of Georgia, and not only illustrate the propositions here announced, but also demonstrate their great value in agriculture.

**TABLE 30. CHEMICAL COMPOSITION OF CLAYS FROM THE ZUIDERZEE.**

<table>
<thead>
<tr>
<th></th>
<th>First.</th>
<th>Second.</th>
<th>Third.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insoluble Quartzose sand, with</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alumina and Silica,</td>
<td>-</td>
<td>-</td>
<td>57.646</td>
</tr>
<tr>
<td>Soluble Silica,</td>
<td>-</td>
<td>-</td>
<td>2.340</td>
</tr>
<tr>
<td>Alumina,</td>
<td>-</td>
<td>-</td>
<td>1.830</td>
</tr>
<tr>
<td>Peroxide of Iron,</td>
<td>-</td>
<td>-</td>
<td>9.039</td>
</tr>
<tr>
<td>Protoxide of Iron,</td>
<td>-</td>
<td>-</td>
<td>0.350</td>
</tr>
<tr>
<td>Protoxide of Manganese,</td>
<td>-</td>
<td>-</td>
<td>0.288</td>
</tr>
<tr>
<td>Lime,</td>
<td>-</td>
<td>-</td>
<td>4.092</td>
</tr>
<tr>
<td>Magnesia,</td>
<td>-</td>
<td>-</td>
<td>0.130</td>
</tr>
<tr>
<td>Potash,</td>
<td>-</td>
<td>-</td>
<td>1.026</td>
</tr>
</tbody>
</table>
We are at once impressed with the important fact that these clays contain all the elements necessary for the growth and development of plants and animals. We shall hereafter show that the Joint clay not only in like manner contains all the elements necessary for the constitution of plants and animals, but also contains a much larger proportion of Phosphoric Acid, than these clays; and has by the abundance of this fertilizing element rendered the soils with which it has been mixed exceedingly fertile and durable, and has through the vegetable kingdom exerted most marked and important influences upon the physical structure of the inhabitants.

Notwithstanding that many clays contain all the inorganic compounds necessary for the production of vegetables, still, in almost every case, these compounds are insoluble, and can be obtained by the plants growing in the soil, only in small quantities.

Carefully conducted experiments have demonstrated conclusively, not only that these inorganic salts are absolutely necessary to the existence of the higher species of plants used by man for food and clothing, but also that these salts

<table>
<thead>
<tr>
<th></th>
<th>First</th>
<th>Second</th>
<th>Third</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soda,</td>
<td>1.972</td>
<td>2.069</td>
<td>1.937</td>
</tr>
<tr>
<td>Ammonia,</td>
<td>0.060</td>
<td>0.078</td>
<td>0.075</td>
</tr>
<tr>
<td>Phosphoric Acid</td>
<td>0.466</td>
<td>0.234</td>
<td>0.478</td>
</tr>
<tr>
<td>Sulphuric Acid</td>
<td>0.896</td>
<td>1.104</td>
<td>0.576</td>
</tr>
<tr>
<td>Carbonic Acid</td>
<td>6.085</td>
<td>6.940</td>
<td>4.775</td>
</tr>
<tr>
<td>Chlorine,</td>
<td>1.240</td>
<td>1.302</td>
<td>1.418</td>
</tr>
<tr>
<td>Humic Acid,</td>
<td>2.798</td>
<td>3.991</td>
<td>3.428</td>
</tr>
<tr>
<td>Crenic Acid,</td>
<td>0.771</td>
<td>0.730</td>
<td>0.037</td>
</tr>
<tr>
<td>Apoerenic Acid</td>
<td>0.107</td>
<td>0.160</td>
<td>0.152</td>
</tr>
<tr>
<td>Humic, Vegetable remains and Water chemically combined</td>
<td>3.324</td>
<td>7.700</td>
<td>9.348</td>
</tr>
<tr>
<td>Wax and Resin,</td>
<td>trace</td>
<td>trace</td>
<td>trace</td>
</tr>
<tr>
<td>Loss,</td>
<td>0.542</td>
<td>0.611</td>
<td>0.753</td>
</tr>
</tbody>
</table>

100.000 100.000 100.000
to be available to plants must be in a soluble condition. It is evident therefore, that whatever tends to decompose and render soluble the insoluble constituents of clays, will add to the fertility of the soil.

This is precisely the effect accomplished by lime. By its action upon the inorganic constituents of the soil, the insoluble silicates of the clay are decomposed, and alumina and magnesia, and the alkalies, potash and soda, are set free, and silica is rendered soluble.

In adding lime to the insoluble silicates of the soil, the agriculturist acts in precisely the same manner that the chemist does when he wishes to separate the constituents of some insoluble and apparently undecomposable mineral as felspar. In both cases the silica is separated and the alkalies liberated; and it is well known to agriculturists that these alkalies are of the greatest importance in the successful cultivation of corn and cotton, and in fact, of all plants. To substantiate the value of these alkalies combined with silicic acid, we need look no farther than to the valuable effects of the Green Sand of New Jersey, the chemical composition of which we have before given. See page 46, table 12.

(e) Chemical effects of Lime upon the Organic Constituents of Soils.

The organic matters existing in the soil have been derived from both the vegetable and the animal kingdoms. It is well known that these two kingdoms are mutually dependent—the vegetable kingdom is a great laboratory, worked by the forces of the sun and fixed stars, in which materials are prepared and elaborated for the animal kingdom; whilst the animal kingdom consumes these materials prepared by plants, and derives from their chemical changes precisely the same amount of force which was expended by the sun and fixed stars in the vegetable laboratory, it does not destroy this matter, but merely changes its form. The vegetable products, the starch, the sugar, and all the various compounds consumed by the animal kingdom, are
converted into various compounds and restored to the soil, and to the atmosphere. The principal portion restored to the atmosphere, the poisonous Carbonic acid gas constitutes an important element of the food of plants—the same is true of the ammonia resulting from the decomposition of the feces and urine, and bodies of animals. It is admitted that from the atmosphere, Carbonic acid gas, water, ammonia and the inorganic salts, furnished by the animal kingdom, all the various vegetable products may be formed.

The vegetable kingdom in like manner with the animal kingdom, is liable to constant change, generation succeeds generation; and as in the case of animals, the dead are added to the soil and atmosphere. The products of the decomposition of the vegetable kingdom which we call Humus, have all existed in the atmosphere, at some former period in the form of gas, and will exist in some future period again in the atmosphere in the form of gas, and will again be absorbed by the vegetable kingdom, and under the influence of the heat and light of the sun these gases will again be decomposed, the elements combined with other elements so as to form solids, destined to go through the same round of changes.

The great fact which we wish, by these well established facts, to illustrate and impress upon the minds of the planters is, that the organic matters of the soil are in a state of change, and that this change is absolutely necessary to the existence of the vegetable and animal kingdoms. If the organic matters of the soil remain unchanged, vegetation would go on consuming the Carbonic acid and Ammonia, and the nitrogen of the atmosphere, and converting the great proportion of the compounds resulting from the action of the vegetable kingdom into insoluble useless forms. Whilst it would be true that the animal kingdom would convert a certain portion of the compounds formed by plants into those gaseous compounds necessary for the existence of the vegetable kingdom, still it is evident that there would be a constant diminution of the matter circula-
ting between the two kingdoms, for every leaf and tree that died would abstract a certain portion of this changing matter, and place it in a state of permanent rest.

Humus then is one of the states through which matter passes during its circulation between the animal and vegetable kingdoms.

The principle of practical importance which we derive from these facts is, that the rapid change of vegetable and animal matters into gaseous products is favorable to the development and perfection of crops.

If wood, leaves and vegetable matters generally be exposed to the action of the air, they gradually undergo decomposition, and various products as humic, ulmic, geic, crenic and aprocenic acids are formed, together with Carbonic acid—that most important gas to plants. The rapidity of the decomposition of the vegetable matters will depend upon the temperature, the moisture of the air, and the thoroughness with which the matters undergoing decomposition are exposed to the action of the oxygen of the atmosphere. When the atmosphere has free access, the oxygen of the air is converted into an equal volume of Carbonic gas, and a large quantity of water is evolved, whilst also a small portion of nitrogen is absorbed, and ammonia, that most valuable food of plants is generated. If on the other hand, the supply of air be cut off and the decomposition of the vegetable matters takes place under water, but a small portion of Carbonic acid will be generated, and the products of the decomposition will be far more insoluble and stable than those resulting from the decomposition of the vegetable matters freely exposed to the atmosphere. The insolubility and indestructibility of the products resulting from the slow changes of wood and vegetable matter in general, in positions where they are in great measure excluded from the action of the oxygen of the atmosphere, may be readily seen in the varieties of coal, lignite and peat, which exert little or no effect upon plants, unless they be first decomposed by the action of some substance possessing power-
ful chemical affinities and capable of exciting decomposition. Whilst peat in its natural state, on account of its insolubility and its power of resisting chemical change, is comparatively valueless as an application by itself to land, still when mixed with lime, it acts most beneficially not only by the compounds resulting from the decomposition of its organic carbonaceous compounds, but also by the liberation during this decomposition of its inorganic salts.

Insoluble organic compounds analogous to peat and comparatively valueless in themselves, exist in every soil; and the value of the organic matters of soils depends not only upon the quantity, but upon the state in which they exist.

We conclude from these facts that any substance which is capable of exciting chemical changes in the various organic constituents of the soil, will render the soil more fertile by assisting in these changes which result in the formation of gases and soluble compounds, and in the liberation of inorganic salts, which are absolutely necessary to a luxuriant vegetation.

It is evident, therefore, that the effects of lime upon the organic constituents of the soil are as important, if not even more important than upon the inorganic constituents; for it occasions the decomposition of the organic matters, and thus gives rise to the formation of carbonic and nitric acids and ammonia, and at the same time liberates the saline constituents of former vegetation, in states of combination well fitted for assimilation by the growing crop.

In the application of lime to the soil it is important that planters should bear in mind the following principles:

First, As lime promotes the decomposition of the organic matters, they must be carefully supplied to the land under cultivation, yearly, for if they be not, then the land will be exhausted more rapidly than if no lime had been applied.

Second, As the organic matter of the soil is decomposed by the simultaneous action of the lime, atmospheric air and moisture, and as the formation of the nitric acid and ammonia takes place at the expense, in part, of the nitro-
gen of the atmosphere, it is not necessary to add immense quantities of lime to the soil; it is not necessary to incorporate the lime with the soil to a great depth. It would be best to make yearly applications, and apply the lime near the surface.

Third, Lime in the caustic state (quick lime from the kiln) acts more rapidly upon the organic matters than the carbonate of lime, which is the form in which it invariably exists in nature, hence quick lime may be employed in much smaller quantities than marl or shell limestone in its natural state; hence quick lime should not be added to the manure pile, while marl and shell limestone may in many cases be mixed, with beneficial effects, directly with the cow-pen and stable manure; and hence the effects of marl and shell limestone in their natural conditions upon vegetation are slower than that of quick lime.

Fourth: Without a sufficient supply of lime to the soil we can never obtain the full effects of manures.

A still farther examination of the chemical constitution of the soils of various countries establishes the following proposition:

(f) Soils differ greatly in the proportion of Phosphate of Lime and of Phosphoric Acid, both in their natural and in their cultivated states.

In the majority of the analyses of American soils, Phosphate of Lime and Phosphoric Acid has not been separated, and in those in which its presence has been indicated it has been in most cases represented simply as a trace.

In almost every American soil yet examined, Phosphate of Lime and Phosphoric Acid are deficient.

Phosphate of Lime and Phosphoric Acid enter into the constitution of all plants and animals, and is absolutely essential to their development and perfection.

Careful experiments in Europe and in this country demonstrate that the Phosphate of Lime is a valuable fertilizer to all lands. The fertility of the lands of England are due in great measure to the extensive employment of marls, rich in the Phosphate of lime; and the most wonderful
effects have been produced upon the exhausted lands of Maryland and Virginia, by the application of marl containing, if not as great an amount of Phosphate of Lime as those of England, still a quantity greater than that contained in a liberal application of the best Phosphatic Guanos.

If we institute a comparison between the amounts of Phosphate of Lime contained in the soils of Europe and America with the amounts of this substance existing in the various marls and shell limestone of Georgia, we will be convinced of the great value of these native deposits.

We will consider the value of Phosphate of Lime more fully under the following division of our subject:

VII. Relations of the Shell Limestone and Marls of Georgia to Plants and Animals.

Lime is indispensable to the healthy constitution of plants and animals.

This proposition will be conclusively demonstrated by the following tables, which will prove of great value to the planter, not merely in their present use, but also as affording important information upon the constitution of the ashes of various plants and animals.

Table 31—Showing the proportions of Phosphate of Lime, Phosphate of Magnesia, Carbonate of Lime and Carbonate of Magnesia in various vegetable and animal structures.
### Analyses of the Ash of Cotton, Wool, and Cotton Seed.*

<table>
<thead>
<tr>
<th></th>
<th>Wool</th>
<th>Seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbonate of Potassa (with possible traces of Soda)</td>
<td>44.19</td>
<td></td>
</tr>
<tr>
<td>Phosphate of Lime, with traces of Magnesia</td>
<td>25.44</td>
<td>61.64</td>
</tr>
<tr>
<td>Carbonate of Lime</td>
<td>5.85</td>
<td>0.41</td>
</tr>
<tr>
<td>Carbonate of Magnesia</td>
<td>6.87</td>
<td>0.26</td>
</tr>
<tr>
<td>Silica</td>
<td>4.12</td>
<td>1.74</td>
</tr>
<tr>
<td>Alumina, (probably accidental)</td>
<td>1.40</td>
<td></td>
</tr>
<tr>
<td>Sulphate of Potassa</td>
<td>2.70</td>
<td>2.55</td>
</tr>
<tr>
<td>Chloride of Potassium</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>Chlorides of Potassium, Magnesium, Sulphate of Lime, Phosphate of Potassa, Oxide of Lime in minute traces, and loss</td>
<td>6.43</td>
<td></td>
</tr>
<tr>
<td>Phosphate of Potassa, (with traces of Soda)</td>
<td></td>
<td>31.51</td>
</tr>
<tr>
<td>Carbonate of Potassa, Sulphates of Lime and Magnesia, Alumina and Oxides of Iron and Manganese in traces</td>
<td></td>
<td>1.64</td>
</tr>
</tbody>
</table>

Or the composition may be expressed thus:

<table>
<thead>
<tr>
<th></th>
<th>Wool</th>
<th>Seed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphoric Acid</td>
<td>12.30</td>
<td>45.35</td>
</tr>
<tr>
<td>Lime</td>
<td>17.05</td>
<td>29.79</td>
</tr>
<tr>
<td>Magnesia</td>
<td>3.26</td>
<td></td>
</tr>
<tr>
<td>Potassa</td>
<td>31.09</td>
<td>19.40</td>
</tr>
<tr>
<td>Sulphuric Acid</td>
<td>1.22</td>
<td>1.16</td>
</tr>
</tbody>
</table>

From these data Prof. Shepard calculates that for every 10,000 lbs. of Cotton Wool, about 60 lbs. of saline matter would be abstracted, having the following constitution:

- Potassa: 31 pounds
- Lime: 17 pounds
- Magnesia: 3 pounds
- Phosphoric Acid: 12 pounds
- Sulphuric Acid: 1 pound

### Analysis of a Cotton Stalk—By J. Lawrence Smith, M. D.

The ashes of a healthy cotton-stalk, six feet high, and an inch in diameter, at the largest part, with some leaves and empty pods, consists of, in 100 parts:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lime</td>
<td>30.3</td>
</tr>
<tr>
<td>Potash</td>
<td>24.3</td>
</tr>
<tr>
<td>Phosphoric Acid</td>
<td>9.1</td>
</tr>
<tr>
<td>Magnesia</td>
<td>5.8</td>
</tr>
<tr>
<td>Oxide of Iron</td>
<td>0.4</td>
</tr>
<tr>
<td>Sulphuric Acid</td>
<td>1.3</td>
</tr>
<tr>
<td>Chlorine</td>
<td>0.8</td>
</tr>
<tr>
<td>Carbonic Acid</td>
<td>27.0</td>
</tr>
<tr>
<td>Sand</td>
<td>0.5</td>
</tr>
</tbody>
</table>

### Analysis of the Fibre of Sea Island Cotton, by Dr. Ure.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbonate of Potash</td>
<td>44.8</td>
</tr>
<tr>
<td>Chloride of Potassium</td>
<td>9.9</td>
</tr>
<tr>
<td>Sulphate of Potassa</td>
<td>9.3</td>
</tr>
<tr>
<td>Phosphate of Lime</td>
<td>9.0</td>
</tr>
<tr>
<td>Carbonate of Lime</td>
<td>10.6</td>
</tr>
<tr>
<td>Phosphate of Magnesia</td>
<td>8.4</td>
</tr>
<tr>
<td>Peroxide of Iron</td>
<td>3.0</td>
</tr>
<tr>
<td>Alumina, a trace, and loss</td>
<td>5.0</td>
</tr>
</tbody>
</table>
**TABLE 32—SHOWING THE COMPOSITION OF THE ASHES OF WHEAT, ACCORDING TO RECENT ANALYSES.**

<table>
<thead>
<tr>
<th>Plants, or parts of Plants</th>
<th>Locality of Plant</th>
<th>Analyst.</th>
<th>Remarks.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ashes in dry plants when all waters are sufficiently removed</td>
<td>Giessen</td>
<td>Will and Fresenius</td>
<td>This wheat being grown near the sea part of the Potash is substituted by Soda.</td>
</tr>
<tr>
<td>Grain, red</td>
<td>Leipsic</td>
<td>Schmidt</td>
<td>Grown in calcareous stone-brash, white calcareous brash and clay.</td>
</tr>
<tr>
<td>Grain, white</td>
<td>Holland</td>
<td>Bichon</td>
<td>Seed of previous year's</td>
</tr>
<tr>
<td>Wheat, foreign growth</td>
<td>Sulz. Hesse-Cassell</td>
<td>Thon</td>
<td></td>
</tr>
<tr>
<td>Hopetown Wheat, grown in England</td>
<td>Bechelbronnn Alsace</td>
<td>Bouissingault</td>
<td></td>
</tr>
<tr>
<td></td>
<td>France</td>
<td>Way and Ogaden</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Odessa</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adrianopol</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Egypt</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cirencester</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Knapp's Chemistry applied to the Arts and Manufactures—vol. 3, p. 81.
## Table 33—Showing the Chemical Composition of the Ash of Barley, Oats, Indian Corn, Tea, Coffee, Tobacco, &c.

<table>
<thead>
<tr>
<th>Plants, or parts of Plants</th>
<th>Ashes in 100 parts of crop as taken from the ground</th>
<th>Ashes in artificially dried plants</th>
<th>Polish</th>
<th>Soda</th>
<th>Magnesia</th>
<th>Lime</th>
<th>Phosphoric Acid</th>
<th>Sulphate of Iron</th>
<th>Silica</th>
<th>Peroxide of Iron</th>
<th>Chloride of Sodium</th>
<th>Chloride of Potassium</th>
<th>Locality of Plant</th>
<th>Analyst</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barley, grain and straw</td>
<td>7.15</td>
<td>15.86</td>
<td>3.96</td>
<td>11.81</td>
<td>7.67</td>
<td>4.37</td>
<td>37.27</td>
<td>2.83</td>
<td>1.84</td>
<td>1.84</td>
<td></td>
<td></td>
<td>Oxford</td>
<td>Daubeny</td>
</tr>
<tr>
<td>Grain of</td>
<td>2.94</td>
<td>19.1</td>
<td>7.00</td>
<td>3.36</td>
<td>49.63</td>
<td>0.26</td>
<td>21.99</td>
<td>1.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ensham</td>
<td>do</td>
</tr>
<tr>
<td>do</td>
<td>2.37</td>
<td>3.91</td>
<td>10.05</td>
<td>3.36</td>
<td>49.63</td>
<td>0.26</td>
<td>21.99</td>
<td>1.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cleves</td>
<td>Bichon</td>
</tr>
<tr>
<td>Grain, without husk</td>
<td>2.3</td>
<td>29.50</td>
<td>15.90</td>
<td>2.90</td>
<td>47.00</td>
<td>1.00</td>
<td>1.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>France</td>
<td>Boussingault</td>
</tr>
<tr>
<td>Mean of 10, analysis of barley grain</td>
<td>2.34</td>
<td>2.43</td>
<td>19.77</td>
<td>3.93</td>
<td>8.55</td>
<td>2.58</td>
<td>26.49</td>
<td>1.43</td>
<td>0.47</td>
<td></td>
<td></td>
<td></td>
<td>Cirencester</td>
<td>Way and Ogden</td>
</tr>
<tr>
<td>Oats, grain</td>
<td>2.75</td>
<td>3.13</td>
<td>13.97</td>
<td>1.50</td>
<td>8.82</td>
<td>4.33</td>
<td>24.73</td>
<td>0.43</td>
<td>0.36</td>
<td></td>
<td></td>
<td></td>
<td>Scotland</td>
<td>Fromberg</td>
</tr>
<tr>
<td>Mean of 7, analysis of Oats, grain</td>
<td>2.90</td>
<td>3.02</td>
<td>16.76</td>
<td>2.49</td>
<td>7.70</td>
<td>3.22</td>
<td>18.19</td>
<td>1.29</td>
<td>4.78</td>
<td>0.64</td>
<td>0.30</td>
<td>8.19</td>
<td>United States</td>
<td>Fromberg</td>
</tr>
<tr>
<td>Mean of 2, anal. of Oats without husk</td>
<td>2.18</td>
<td>26.18</td>
<td>9.95</td>
<td>5.55</td>
<td>43.34</td>
<td>10.45</td>
<td>2.67</td>
<td>0.40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bechelbronn</td>
<td>Letellier</td>
</tr>
<tr>
<td>Oat-husks</td>
<td>6.19</td>
<td>6.99</td>
<td>1.01</td>
<td>4.51</td>
<td>2.63</td>
<td>5.01</td>
<td>74.73</td>
<td>0.61</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean of 4, analysis of oat-husks</td>
<td>6.79</td>
<td>9.13</td>
<td>7.34</td>
<td>15.44</td>
<td>1.59</td>
<td>39.68</td>
<td>5.54</td>
<td>2.09</td>
<td>0.60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indian Corn</td>
<td>20.0</td>
<td>9.54</td>
<td>17.0</td>
<td>1.3</td>
<td>50.1</td>
<td>0.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>do do</td>
<td>16.22</td>
<td>1.44</td>
<td>4.87</td>
<td>2.77</td>
<td>1.44</td>
<td>0.30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rice Grain</td>
<td>18.48</td>
<td>10.67</td>
<td>1.69</td>
<td>1.27</td>
<td>53.36</td>
<td>3.55</td>
<td>0.45</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rice Husk</td>
<td>1.60</td>
<td>1.55</td>
<td>1.96</td>
<td>1.01</td>
<td>1.86</td>
<td>0.92</td>
<td>59.71</td>
<td>0.54</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millet Grain</td>
<td>9.58</td>
<td>1.31</td>
<td>7.66</td>
<td>0.60</td>
<td>18.19</td>
<td>0.35</td>
<td>59.63</td>
<td>0.63</td>
<td>1.43</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pea</td>
<td>3.18</td>
<td>3.91</td>
<td>9.85</td>
<td>6.47</td>
<td>5.91</td>
<td>4.91</td>
<td>1.05</td>
<td>0.73</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Pea</td>
<td>3.23</td>
<td>3.19</td>
<td>12.76</td>
<td>8.60</td>
<td>24.34</td>
<td>5.56</td>
<td>0.25</td>
<td>0.96</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Soy Bean</td>
<td>4.16</td>
<td>20.82</td>
<td>19.06</td>
<td>8.81</td>
<td>7.26</td>
<td>1.34</td>
<td>2.46</td>
<td>1.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bean</td>
<td>4.41</td>
<td>38.89</td>
<td>11.78</td>
<td>9.03</td>
<td>5.90</td>
<td>2.47</td>
<td>0.44</td>
<td>0.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lentil</td>
<td>2.60</td>
<td>34.31</td>
<td>13.3</td>
<td>2.44</td>
<td>6.24</td>
<td>1.31</td>
<td>1.98</td>
<td>0.56</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plants, or parts of Plants</td>
<td>Ashes in 100 parts of crop</td>
<td>Potash</td>
<td>Soda</td>
<td>Magnesia</td>
<td>Lime</td>
<td>Phosphoric Acid</td>
<td>Sulphuric Acid</td>
<td>Peroxide of Iron</td>
<td>Chloride of Sodium</td>
<td>Chloride of Potassium</td>
<td>Locality of Plant</td>
<td>Analyst</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------</td>
<td>---------------------------</td>
<td>--------</td>
<td>------</td>
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<td>46.24</td>
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<td>6.57</td>
<td>49.74</td>
<td>2.39</td>
<td>3.24</td>
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</tr>
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<td>44.68</td>
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### Table 32—Continued.

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<tr>
<th>Plants, or parts of Plants</th>
<th>Locality of Plant</th>
<th>Analysist</th>
<th>Remarks</th>
</tr>
</thead>
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<tr>
<td>Ashes in dry plants when all water is artifically removed</td>
<td>Gloucestershine</td>
<td>Way and Osgden</td>
<td>Sandy Loam.</td>
</tr>
<tr>
<td>Potash</td>
<td></td>
<td></td>
<td>do do</td>
</tr>
<tr>
<td>Soda</td>
<td></td>
<td></td>
<td>Calcareous Soil.</td>
</tr>
<tr>
<td>Magnesia</td>
<td></td>
<td></td>
<td>Clayey Loam.</td>
</tr>
<tr>
<td>Lime</td>
<td></td>
<td></td>
<td>Sandy Calcareous Soil</td>
</tr>
<tr>
<td>Magnesia</td>
<td></td>
<td></td>
<td>Calcareous Clay.</td>
</tr>
<tr>
<td>Phosphoric Acid</td>
<td></td>
<td></td>
<td>Calcareous Clay.</td>
</tr>
<tr>
<td>Sulphate Acid</td>
<td></td>
<td></td>
<td>Clayey Sand.</td>
</tr>
<tr>
<td>Silica</td>
<td></td>
<td></td>
<td>Calcareous</td>
</tr>
<tr>
<td>Peroxide of Iron</td>
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<td></td>
<td></td>
</tr>
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<td>Chloride of Sodium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.72</td>
<td>1.95-29.75</td>
<td>0.64</td>
<td>13.79</td>
</tr>
<tr>
<td>1.73</td>
<td>1.97-29.91</td>
<td>1.87</td>
<td>14.06</td>
</tr>
<tr>
<td>1.61</td>
<td>1.81-30.13</td>
<td>1.25</td>
<td>11.46</td>
</tr>
<tr>
<td>1.60</td>
<td>1.80-30.023</td>
<td>0.82</td>
<td>13.39</td>
</tr>
<tr>
<td>1.90</td>
<td>2.13-29.17</td>
<td>2.20</td>
<td>14.23</td>
</tr>
<tr>
<td>1.93</td>
<td>1.96-26.70</td>
<td>2.12</td>
<td>12.76</td>
</tr>
<tr>
<td>Old Red Lamas Wheat, grown in England</td>
<td>Wantage</td>
<td>do do</td>
<td>do</td>
</tr>
<tr>
<td>Spalding Wheat</td>
<td>Cirencester</td>
<td>do do</td>
<td>do do</td>
</tr>
<tr>
<td>Creeping Wheat</td>
<td>Hackness</td>
<td>do do</td>
<td>do</td>
</tr>
<tr>
<td>do do</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean of the 32 Analyses</td>
<td>1.77</td>
<td>1.95-29.97-30.023</td>
<td>0.64</td>
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</table>

**OF GEORGIA.**
Table 34.—Proportion of Sulphur and Phosphorous in Plants and Grain, according to H. C. Sorby. Liebig's and Kopps, A. R. P. of C. vol. 2, p. 128. Sulphur and Phosphorous in 100 parts of substances, dried at 212°.

<table>
<thead>
<tr>
<th>Plant Name</th>
<th>Sulphur</th>
<th>Phosphorous</th>
</tr>
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<tbody>
<tr>
<td>Pea palustris and trifolium</td>
<td>0.069</td>
<td>0.360</td>
</tr>
<tr>
<td>Lolium perenneum</td>
<td>0.096</td>
<td>0.143</td>
</tr>
<tr>
<td>Italian Rye Grass</td>
<td>0.097</td>
<td>0.170</td>
</tr>
<tr>
<td>Trifolium pratense (very fine kind)</td>
<td>0.087</td>
<td>0.131</td>
</tr>
<tr>
<td>Trifolium pratense (ordinary do.)</td>
<td>0.131</td>
<td>0.123</td>
</tr>
<tr>
<td>Medicago lupulina (very fine)</td>
<td>0.130</td>
<td>0.125</td>
</tr>
<tr>
<td>Medicago sativa</td>
<td>0.025</td>
<td>0.213</td>
</tr>
<tr>
<td>Vicia Sativa</td>
<td>0.230</td>
<td>0.033</td>
</tr>
<tr>
<td>Kidney Potatoes (Solanum tuberosum)</td>
<td>0.049</td>
<td>0.213</td>
</tr>
<tr>
<td>Tops of Kidney Potatoes</td>
<td>0.089</td>
<td>0.253</td>
</tr>
<tr>
<td>Fruit of Kidney Potatoes</td>
<td>0.017</td>
<td>0.039</td>
</tr>
<tr>
<td>American Potatoes</td>
<td>0.038</td>
<td>0.109</td>
</tr>
<tr>
<td>Tops of American Potatoes</td>
<td>0.089</td>
<td>0.233</td>
</tr>
<tr>
<td>Lactis Cardia, roots</td>
<td>0.091</td>
<td>0.236</td>
</tr>
<tr>
<td>do do tops</td>
<td>0.743</td>
<td>0.923</td>
</tr>
<tr>
<td>Beta Altescina, roots</td>
<td>0.068</td>
<td>0.124</td>
</tr>
<tr>
<td>do de tops</td>
<td>0.068</td>
<td>0.124</td>
</tr>
<tr>
<td>Brassica Rapa, roots</td>
<td>0.351</td>
<td>0.232</td>
</tr>
<tr>
<td>Delta do de</td>
<td>0.347</td>
<td>0.244</td>
</tr>
<tr>
<td>Brassica Oleracea, (Swedish Turnip)</td>
<td>0.435</td>
<td>0.172</td>
</tr>
<tr>
<td>do Oleifera, (Rape)</td>
<td>0.349</td>
<td>0.233</td>
</tr>
<tr>
<td>Brass, Campeslea, (Drumhead Cabbage)</td>
<td>0.429</td>
<td>0.267</td>
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<tr>
<td>Wheat Plant entire, (Triticum Vulgare)</td>
<td>0.131</td>
<td>0.124</td>
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<tr>
<td>after flowering</td>
<td>0.170</td>
<td>0.140</td>
</tr>
<tr>
<td>do do do</td>
<td>0.075</td>
<td>0.071</td>
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<tr>
<td>Straw of Wheat when grain was formed,</td>
<td>0.240</td>
<td>0.182</td>
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Table 35.—Ash of Yolk and White of Hen’s Eggs—Poleck.*

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<th>Substance</th>
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<th>No. 2</th>
<th>No. 1</th>
<th>No. 2</th>
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<tr>
<td>Chloride of Potassium</td>
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<td>42.17</td>
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<td>37.54</td>
<td>38.78</td>
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<td>9.16</td>
<td>14.07</td>
<td>11.03</td>
<td>16.42</td>
<td>8.44</td>
<td>12.78</td>
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<tr>
<td>Soda</td>
<td>23.04</td>
<td>16.09</td>
<td>25.12</td>
<td>18.27</td>
<td>23.04</td>
<td>16.09</td>
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<td>Potasssa</td>
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<td>1.15</td>
<td>8.93</td>
<td>8.05</td>
<td>2.36</td>
<td>1.15</td>
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<tr>
<td>Lime</td>
<td>1.74</td>
<td>2.79</td>
<td>12.21</td>
<td>13.28</td>
<td>1.74</td>
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<td>Magnesia</td>
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<td>3.17</td>
<td>2.27</td>
<td>2.47</td>
<td>1.60</td>
<td>3.17</td>
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<td>Sesquioxide of Iron</td>
<td>4.83</td>
<td>3.79</td>
<td>5.72</td>
<td>6.57</td>
<td>4.83</td>
<td>3.79</td>
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<tr>
<td>Hydrated Phosphoric Acid</td>
<td>11.60</td>
<td>11.52</td>
<td>63.81</td>
<td>66.70</td>
<td>11.60</td>
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<td>6.98</td>
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<tr>
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<td>0.55</td>
<td>1.40</td>
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### Table 36.—Ashes of Man and Other Animals—Verdeil.*

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<th></th>
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<th>Ox</th>
<th>Sheep</th>
<th>Pig</th>
<th>Calif.</th>
<th>Man</th>
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<tbody>
<tr>
<td></td>
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<td>No.2</td>
<td>No.1</td>
<td>No.2</td>
<td>No.1</td>
<td>No.2</td>
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<tr>
<td>Choline</td>
<td>39.25</td>
<td>30.94</td>
<td>36.85</td>
<td>32.40</td>
<td>34.66</td>
<td>30.72</td>
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<tr>
<td>Sodium</td>
<td>19.02</td>
<td>19.00</td>
<td>20.32</td>
<td>18.96</td>
<td>18.49</td>
<td>19.14</td>
</tr>
<tr>
<td>Soda</td>
<td>5.78</td>
<td>5.72</td>
<td>7.02</td>
<td>6.06</td>
<td>6.53</td>
<td>5.72</td>
</tr>
<tr>
<td>Phosphate</td>
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<td>0.87</td>
<td>0.58</td>
<td>0.88</td>
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<td>Magnesia</td>
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<td>0.66</td>
<td>0.60</td>
<td>0.66</td>
<td>0.66</td>
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<tr>
<td>Sulphuric Acid</td>
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<td>1.89</td>
<td>1.25</td>
<td>1.56</td>
<td>1.84</td>
<td>1.74</td>
</tr>
<tr>
<td>Phosphoric Acid</td>
<td>1.27</td>
<td>1.34</td>
<td>1.38</td>
<td>1.36</td>
<td>1.38</td>
<td>1.38</td>
</tr>
<tr>
<td>Lime</td>
<td>0.10</td>
<td>0.07</td>
<td>0.05</td>
<td>0.08</td>
<td>0.05</td>
<td>0.09</td>
</tr>
<tr>
<td>Carbonic Acid</td>
<td>1.25</td>
<td>0.73</td>
<td>0.57</td>
<td>0.70</td>
<td>0.69</td>
<td>0.69</td>
</tr>
</tbody>
</table>


### Table 37—Composition of the Blood of Man and Animals in normal condition, in 100 parts, according to Poggiale.*

<table>
<thead>
<tr>
<th></th>
<th>Man</th>
<th>Cow</th>
<th>Pig</th>
<th>Calif.</th>
<th>Sheep</th>
<th>Rabbit</th>
<th>Dog</th>
<th>Cat</th>
<th>Fox</th>
<th>Hare</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>779.7</td>
<td>767.6</td>
<td>782.2</td>
<td>788.4</td>
<td>786.0</td>
<td>789.0</td>
<td>780.0</td>
<td>780.0</td>
<td>780.0</td>
<td>775.0</td>
</tr>
<tr>
<td>Blood Corpuscles</td>
<td>130.1</td>
<td>145.0</td>
<td>125.1</td>
<td>126.2</td>
<td>125.2</td>
<td>126.0</td>
<td>126.0</td>
<td>126.0</td>
<td>126.0</td>
<td>126.0</td>
</tr>
<tr>
<td>Albumen</td>
<td>77.4</td>
<td>74.0</td>
<td>65.5</td>
<td>67.2</td>
<td>55.3</td>
<td>85.0</td>
<td>85.0</td>
<td>85.0</td>
<td>85.0</td>
<td>85.0</td>
</tr>
<tr>
<td>Fibrin</td>
<td>2.1</td>
<td>2.3</td>
<td>5.4</td>
<td>6.5</td>
<td>4.1</td>
<td>3.2</td>
<td>3.2</td>
<td>3.2</td>
<td>3.2</td>
<td>3.2</td>
</tr>
<tr>
<td>Fatty Matters</td>
<td>1.1</td>
<td>1.3</td>
<td>2.2</td>
<td>2.2</td>
<td>1.3</td>
<td>1.8</td>
<td>1.6</td>
<td>2.3</td>
<td>2.3</td>
<td>1.7</td>
</tr>
<tr>
<td>Extractive Matters and Salts</td>
<td>9.3</td>
<td>11.8</td>
<td>8.7</td>
<td>10.0</td>
<td>11.2</td>
<td>10.0</td>
<td>8.9</td>
<td>8.5</td>
<td>10.3</td>
<td>9.1</td>
</tr>
</tbody>
</table>


### Table 38.—Ash of Blood, according to Henneberg, 100 parts contain.

<table>
<thead>
<tr>
<th></th>
<th>Blood of Fowls</th>
<th>Blood of Turkey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloride of Potassium</td>
<td>29.14</td>
<td>36.81</td>
</tr>
<tr>
<td>Chloride of Sodium</td>
<td>16.87</td>
<td>3.31</td>
</tr>
<tr>
<td>Soda</td>
<td>21.04</td>
<td>24.02</td>
</tr>
<tr>
<td>Sesquioxide of Iron</td>
<td>3.89</td>
<td>4.77</td>
</tr>
<tr>
<td>Lime</td>
<td>1.03</td>
<td>0.93</td>
</tr>
<tr>
<td>Magnesia</td>
<td>0.22</td>
<td>0.46</td>
</tr>
</tbody>
</table>

Table 39.—Ash of Blood, according to Enderlin. In 100 parts of Ash.

<table>
<thead>
<tr>
<th>Phosphate of Iron</th>
<th>9.61</th>
<th>11.07</th>
<th>6.15</th>
<th>7.95</th>
<th>8.45</th>
<th>8.70</th>
<th>7.5</th>
<th>7.6</th>
<th>9.4</th>
<th>10.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphate of Lime</td>
<td>6.34</td>
<td>12.54</td>
<td>9.69</td>
<td>13.26</td>
<td>14.79</td>
<td>15.0</td>
<td>15.2</td>
<td>13.2</td>
<td>13.3</td>
<td>13.4</td>
</tr>
<tr>
<td>Magnesia</td>
<td>6.04</td>
<td>8.47</td>
<td>26.24</td>
<td>18.57</td>
<td>18.36</td>
<td>25.54</td>
<td>24.4</td>
<td>20.4</td>
<td>20.5</td>
<td>17.9</td>
</tr>
<tr>
<td>Silicate of Potash</td>
<td>59.35</td>
<td>37.20</td>
<td>40.13</td>
<td>46.56</td>
<td>20.59</td>
<td>23.57</td>
<td>37.9</td>
<td>38.4</td>
<td>26.6</td>
<td>7.3</td>
</tr>
<tr>
<td>Sulphate of Potash</td>
<td>2.84</td>
<td>0.56</td>
<td>3.50</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>Chloride of Sodium</td>
<td>26.34</td>
<td>27.20</td>
<td>40.13</td>
<td>46.56</td>
<td>20.59</td>
<td>23.57</td>
<td>37.9</td>
<td>38.4</td>
<td>26.6</td>
<td>7.3</td>
</tr>
<tr>
<td>Silicate of Soda</td>
<td>5.53</td>
<td>2.75</td>
<td>14.6</td>
<td>14.4</td>
<td>14.4</td>
<td>14.4</td>
<td>14.4</td>
<td>14.4</td>
<td>14.4</td>
<td>14.4</td>
</tr>
<tr>
<td>Ash in 100 parts</td>
<td>1.29</td>
<td>1.26</td>
<td>1.23</td>
<td>1.13</td>
<td>1.13</td>
<td>1.13</td>
<td>1.13</td>
<td>1.13</td>
<td>1.13</td>
<td>1.13</td>
</tr>
</tbody>
</table>


The results embodied in these tables, not only sustain the proposition that lime is indispensable to all highly organized plants and animals, but they also establish numerous conclusions and principles of the greatest value to the agriculturist. We shall at present notice only those which have an immediate connexion with the commercial and agricultural relations of the tertiary lime formation of Georgia.

(a) The proportion of lime varies in different plants and animals.

(b) The proportion of lime varies in different parts of the same plant or animal.

It follows from these two propositions: First, different crops abstract different quantities of lime from the soil, and if these crops be sent off the plantation, the loss of lime to the place will depend not merely upon the amount, but also upon the character of the produce.

Second, if animals be raised for market, the amount of lime abstracted from the soil through the vegetable kingdom, will depend upon the mode in which they are prepared for the market. If they be driven off in the living condition, all the lime which they have abstracted from the soil will be lost to the place. If they be killed upon the place, quite a large proportion of the valuable salts which
they have abstracted from the soil will be restored in the form of blood. If they be consumed upon the place, the greatest proportion of the lime which they have abstracted from the soil will be found in the bones.

Third, as animals, whether carnivorous, herbivorous, or graminivorous, subsist ultimately upon the vegetable kingdom; and as the salts which they derive from the soil through the vegetable kingdom, are thrown off in the urine and faeces, it is evident that the lime will be transported in the bodies of the animals from one part of the place to the other, and will accumulate principally at the stables, cow-pens, and the habitations of man.

(c). The proportion of phosphoric acid and of phosphate of lime, varies in different plants and animals, and also varies in different parts of the same plant or animal; and hence different crops and animals abstract different quantities of phosphorous and phosphate of lime from the soil.

(d). Lime and phosphoric acid, although entering largely into the composition of plants and animals, are by no means the only inorganic elements necessary for the development and preservation of the animal and vegetable kingdoms. The salts of soda, potassa, magnesia and iron are equally essential to the perfection of plants and animals, and, as in the case of lime and phosphoric acid, they vary in amount in different plants and animals, and in different parts of the same plant or animal; and hence different crops and animals abstract different quantities of these salts from the soil.

(e). The quantity and character of the inorganic salts, although varying within certain limits, are still remarkably uniform in the same class of plants and animals. We have selected in these tables, to demonstrate this important agricultural fact (that each class of plants and animals must have a definite amount of inorganic salts of a definite constitution), numerous analyses of the same plant by different observers.

It follows from this that the farmer can calculate not only the amounts, but also the character of the salts annually removed from his lands.
Thus in the following crops the amounts of ash in the right hand column would be removed from each acre producing the amount of produce to the acre, assumed in the table:

Table 40.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Weight of crop per acre in lbs.</th>
<th>Ashes per acre in lbs.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>As gathered at 212°.</td>
<td></td>
</tr>
<tr>
<td>Indian Corn—Grain Stalks, leaves and fodder</td>
<td>2250  2000</td>
<td>12.00</td>
</tr>
<tr>
<td>Wheat—Grain Straw</td>
<td>9000  8000</td>
<td>28.80</td>
</tr>
<tr>
<td>Rye—Grain Straw</td>
<td>1450  1300</td>
<td>29.00</td>
</tr>
<tr>
<td>Oats—Grain Straw</td>
<td>4500  4300</td>
<td>236.00</td>
</tr>
<tr>
<td>Tobacco—Leaves</td>
<td>2200  2000</td>
<td>64.00</td>
</tr>
<tr>
<td>Red Clover—Hay</td>
<td>3500  3200</td>
<td>241.00</td>
</tr>
<tr>
<td>Timothy—Hay</td>
<td>800.00  750.00</td>
<td>108.00</td>
</tr>
<tr>
<td>Potatoes—Tubers Tops</td>
<td>600.00  550.00</td>
<td>50.00</td>
</tr>
</tbody>
</table>

Table 41.—Table illustrating the proportions of the various inorganic matters, abstracted from the soil by 1,000 pounds of various kinds of produce.
These tables illustrate in a forcible manner, the exhausting effects of crops, and demonstrate that, whenever the vegetation in any form whatever, as grain, or hay, or fruit, or timber, is removed from the soil the land is gradually impoverished, by the removal of those salts which are necessary to the fertility of the soil.

The great question with the planter is, how can this drain be stopped, and from whence can materials be obtained which will restore to the soil these salts which are carried off in every pound of cotton, and corn and beef.

The preservation of the soil permanently in a state of the highest fertility, is the great problem to be settled by the Southern Agriculturist.

Up to the present time, the Planters of Georgia have attempted no solution of the problem, but have cleared tract after tract of virgin soil, abandoned the worn out lands as soon as they proved unprofitable, and pursued their course of reckless devastation and exhaustion of one of the finest countries in the world, until nothing but furrowed, washed gullied and barren red clay hills, and barren sandy plains are left to the present generation.

The great question of the regeneration of the worn out lands will find its solution in the proper use of the Tertiary Lime formation of Georgia, and of the natural sources of organic matters so abundant in our State.

If we institute a comparison between the amounts of Lime and Phosphoric Acid abstracted by the various crops from each acre of land and the amounts of lime and of Phosphoric Acid contained in a moderate application of the marls and shell limestones of Georgia, we will find that a single application is capable of supplying Lime and Phosphoric Acid equal to the amount removed by the most productive crops of cotton, corn, wheat, rye, oats, potatoes, beans and peas for more than one hundred years.

This demonstration of the value of the marls and shell limestone of Georgia should, we think, lead to their immediate and extensive employment.
We do not for one moment contend that the Tertiary Lime formation of Georgia contains all the ingredients necessary for the entire restoration and preservation of the fertility of the soil.

Whilst Lime should in Georgia, as it does in England, and in every well cultivated country in the world, form the basis of all permanent agricultural improvement and of all husbandry, still it represents only one class of the salts needed by plants and animals, and if, therefore, it be exclusively relied upon disappointment will surely follow, sooner or later.

This leads us to the consideration of the following well established proposition:

*The absence from the soil of any one of the constituents of the Ash of Plants, will prove adverse to vegetation.*

The Prince of Salm-Horstmar performed a series of careful synthetic experiments to determine which of the ash constituents are necessary to the growth of plants. He chose for his experiment the oat plant, sowed the grains in an artificial soil of ignited sugar-charcoal, watered it with distilled water, and supplied the ash constituents by means of the following preparations, which were partly dissolved in the water and partly incorporated in the sugar-charcoal: Silicate of Potassa and Soda, Carbonate, Phosphate and Sulphate of Lime, the Salts of Magnesia, Sesquioxide of Iron, containing Protoxide, with and without Manganese, Sulphate of Protoxide of Iron, Carbonate of Manganese, Carbonate of Ammonia, Nitrate of Lime, Magnesia, and Ammonia. By modifying the experiment in various ways, omitting one, and sometimes all of these preparations—adding them at one time in increasing proportions, and at other times in decreasing quantities, and in each instance accurately observing the growth, appearance and character of the plants thus cultivated, Salm-Horstmar arrived at the following results: without the addition of any of the above mentioned Salts the plants remained dwarfish, but without any abnormal development. For the successful growth of
plants Nitrogen (Ammonia) and the vegetable Ash, constituents must be added at the same time. Absence of the one, especially of the latter, enfeebles the action of the latter. In the absence of Phosphoric Acid, Sulphuric Acid, Potassa, Lime, Iron and Manganese, the plants in every instance, attained an abnormal growth, were feeble and of unnatural softness, and rapidly faded away; they were particularly weak when no Silicic Acid and Magnesia were present. Iron acted most surprisingly upon the luxurious and vigorous appearance, especially in regard to the color, strength of stem and roundness; but when an excess was added it produced dry spots on the plants. Too large a proportion of Manganese caused the leaves to curl up in a peculiar manner. Without weakening the plants, neither the Potassa could be replaced by Soda, nor the Lime by Magnesia.

In the whole of these experiments the plants were placed in abnormal circumstances, and only in one single instance (and in that only a single grain was produced) did they yield corn.

It is evident, therefore, that my duties as Chemist to the Cotton Planters' Convention do not end with the development of the inexhaustible stores of fertility in the Tertiary Lime formations of Georgia—other sources of fertility supplying the salts wanting in the Marls and Shell Limestone of Georgia must be supplied.

CONCLUDED.

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M. Paul, an interne of the Paris hospital, has drawn up a valuable memoir on the effects of lead-poisoning upon the product of conception. We will relate one of his observations as an example, and present a summary of his researches. In February, 1859, a woman entered the Necker Hospital, who had been for eight years working as a polisher of printing type. She was suffering from metrorrhagia, and had an evident satornine cachexia. She sad enjoyed good
health, and had been delivered of three children, happily before taking to the occupation of polisher. Since then her health had been much shattered by lead-diseases. Three months after entering upon this trade she had a first attack of colic, and four years later another. At this time she became pregnant, and bore a dead child. Three years later still, she bore a child which died at the age of five months. She had eight pregnancies all terminating in abortion at two or three months, attended with excessive metrorrhagia. She recovered in M. Bouley's ward, under tonic and restorative treatment.

This case led M. Paul to extended inquiries in the type-foundries and elsewhere. He found that those women almost alone who handle the type are affected by saturnine diseases. In a first series of observations, he found that 4 women had had 15 ascertained pregnancies—of these, 10 ended in abortion, 2 in premature labour, 1 in still-birth, and 1 child died within twenty-four hours.

In a second series of cases, 5 women had borne an aggregate of 9 children at term before exposing themselves to lead, and had no abortion or accident of pregnancy. Since exposure to lead they had 36 pregnancies; of these, 26 ended in abortion at from two to six months; 1 in premature labor; 2 in still-birth; 5 children died, 4 of which within the first year; and 2 children were living, 1 being puny and ailing, the other only three years old.

In a third order, a woman had during her employment in a type foundry five pregnancies, all ending in abortion. She quitted the business and bore a healthy child.

In a fourth order, is the case of a woman who, having left the trade for two periods, bore during these intervals of freedom two healthy children; returning to the trade had two abortions.

In a fifth series M. Paul shows that the same disastrous influence is felt when the fathers handle lead. In 7 cases, every woman had an abortion; of 32 pregnancies occurring during the husbands' exposure to lead, 12 children were born prematurely. Of twenty living children, 8 died in the first year, 3 in the second, 5 in the third, 1 after the third year, 2 remained living.

In the sixth series the author shows that where the lead affection was less marked there was a corresponding diminution of the injurious effect upon the product of conception.
ARTICLE II.

Lectures on Tumors and Outgrowths of the Cervix Uteri. By Joseph A. Eve, M. D., Professor of Obstetrics and Diseases of Women and Children in the Medical College of Georgia.

Lecture First—Uterine Polypi.

Gentlemen:—The subject of our present lecture will be Tumors and Outgrowths of the Cervix Uteri. If time would permit, we would prefer to treat of these affections in reference to the uterus generally, body and fundus as well as the cervix, but that would require a series of many lectures.

At present, our attention will be restricted to those of the cervix, because they most frequently occur in practice, are most accessible to investigation and most amenable to treatment.

The most useful and natural classification is into pediculated and sessile—simple and malignant. Another division might be instituted into those which arise externally and those which, originating in the body of the uterus, or in the cervical canal, either grow downwards into the vagina, or becoming developed internally, are afterwards, by the contractions of the uterus, expelled into the vagina.

We will, in the first place, call your attention to non-malignant, pediculated tumors, generally designated polypi from having a pedicle or footstalk, by which they are attached to some portion of the internal surface of the uterus. The term polypus is derived from two Greek words, Polus and Pous. Strictly speaking, it does not apply to the tumors in question, as they very rarely have more than one origin; although it is said one polypus has been known to have two pedicles, and on the contrary, two polypi have originated from one pedicle. They are called polypi from a supposed resemblance to the animal called polypus. Dr. T. S. Lee's definition of a polypus is a tumor growing from the internal surface of the uterus, attached to it by a stalk, and usually having a pyriform shape; it is smooth, hard
and insensible, and gives rise to violent and frequent hemorrhages.

Causes.—The causes of polypi are so obscure that we will not waste time with any discussion of the subject. They are found at all ages, and under all circumstances, from early childhood to advanced age; they are most frequent during the reproductive period, but rather more frequently, it is thought by some, in the unmarried than the married. I have found them more frequently in married women and widows.

Pathology.—Our limits will not allow us to say much of the pathology of polypi. There are several varieties of polypoid tumors; but there are three principal species which include much the larger portion of all polypi: the glandular, the cellular, and the fibrous. This is the division made by Dr. Churchill, in his excellent work on diseases of women. We may occasionally meet with a case that may not conform strictly to the description of either of these species, but I believe they are very rare, such, at least, is the result of my own experience.

1st. The glandular polypi are enlarged Nabothian glands in the cervical canal. They may be found single, or two or more may exist together; they are generally about the size of small grapes, attached by small and short pedicles; they are usually of the color and firmness of glands; it is said they sometimes contain some mucilaginous fluid. Some very small polypi about this location are found to consist altogether of mucous membrane, others of somewhat larger size, consist of mucous membrane with the addition of cellular tissue.

2d. The cellular polypus is the least frequent. I only remember to have met with two cases. They are said to appear singly or in clusters. The two which occurred in my practice were single. They bear some resemblance to the polypi of the nose; they are described as of a violet or yellow color; the two met with were not unlike a large oyster in color and consistence; their attachment to the ute-
The fibrous polypi are by far the most common. They resemble fibrous tumors in the body of the uterus and other parts of the system. They are generally hard, but vary in consistence and density; there will sometimes be a difference in different parts of the same polypus. It is said they are sometimes hollow, and contain a fluid; such instances, however, I have never seen; they are also said, in some rare cases, to contain hair and other substances. The same polypus, in different stages or periods of development, will be of different degrees of density; from being very soft, it may become harder progressively, until it shall have assumed an osseous or calcareous hardness. They are, at least generally, covered by the mucous membrane of the uterus. The connection with the uterus is, in some cases, by fibrous tissue extending into, or continuous with, the proper substance of that organ; in others it consists simply of mucous membrane and cellular tissue.

Except in rare instances, polypi are insensible; I have not known an exception. I do not, however, doubt the existence of such cases. Insensibility has been considered a means of diagnosis between a polypus and an inverted uretus, but it is not absolute, as polypi may possess sensibility. When this is the case they doubtless have an envelope of uterine fibres; in some instances this covering only extends to the pedicle, and then, although the body of the tumor may be insensible, the application of a ligature causes great pain. Their shape is usually ovoid or pyriform, but it may be modified by the uterus or vagina, in which it is contained. They are of all sizes, from that of a pea to a child’s head, and sometimes much larger. Fibrous polypi generally are found single, but there may be two or more, and after the removal of one, another may descend into the cervix, or through it into the vagina.

When a polypus has a pedicle continuous with the fibrous or muscular coat of the uterus, it is doubtless an outgrowth
Eye. Lectures on

from the internal surface of the cervical canal, body or fundus of the uterus. But when it is merely attached by mucous membrane alone, or with the addition of some cellular tissue, it is most unquestionably a fibrous tumor which, originating in the walls of the uterus, has been enucleated therefrom into its cavity, and by its active contractions expelled through the cervical canal into the vagina.

This variety of fibrous polypus, I believe, occurs as often as that with a fibrous pedicle, if not oftener. These enucleated fibrous tumors have very short pedicles, are held very closely to the surface to which they are attached, and are with difficulty expelled from the cavity of the uterus; they frequently remain a long time partially expelled and require to be removed by passing the ligature, scissors, or polyptome, within the uterus. When separated, the tumor is generally more globular and has no neck or pedicle; and the portion by which it was attached to the uterus is only known by being denuded of mucous membrane; whereas, the other variety is more pyriform and has a portion of its fibrous pedicle remaining. The uterine portion of the pedicle always sloughs off. It never has, I believe, been known to grow again.

The polypus with fibrous pedicle is said to be generally denser than the enucleated fibrous tumor, and denser than the uterine walls with which it appears identical, with the addition of some cellular tissue; this is, however, not always the case. These polypi, when developed in the uterus, are more easily expelled by its contractions into the vagina, and sometimes even through the vulva, as I have known in a remarkable case, which shall be related at the proper time.

It is said the pedicle sometimes gives way, and the polypus thus becomes spontaneously detached. I have never known an instance of this kind, but consider it quite probable, as I have known cases, in which the pedicles, whether consisting of fibrous tissue or mucous membrane, were very slight, and easily divided, sometimes being ruptured
by tractions made on the polypus, for the purpose of excision. The spontaneous separation of polypi may be accounted for in various ways. The neck of the uterus may act as a ligature on the pedicle, suspend the circulation, and thus cause it to slough off; inflammation may produce the same result, or the weight of a large polypus may possibly break the pedicle, when very small.

It is said by Dr. Lee, that "polypoid tumors may undergo all the effects of inflammation," though "very rarely." "An abscess," he says, "may be formed" in their substance and produce great discharge; ulcerations may arise in their surface, sloughings may occur, and even cancerous degeneration may commence." Dr. Churchill says "they are seldom attacked by inflammation or ulceration, and they never degenerate into malignant disease." While I concur with Dr. Churchill in this opinion, I am ready to admit, with Dr. Lee, that sometimes "the pressure of the foreign body in the mucous canal excites a profuse and fetid purulent discharge, under which circumstances, it has been mistaken for malignant disease," a mistake I once made myself in consultation. This case will be stated at the close of the next lecture. The detention of clots in the vagina may also produce the same effect, and lead to the same error in diagnosis.

**Symptoms.—** The principal and most constant symptoms of Polypi are hemorrhage and leucorrhœa. But as these depend on so many other causes, they cannot be considered as diagnostic.

The first indication is generally menorrhagia, which, after a time, becomes usually very frequent, irregular and so profuse as to constitute alarming hemorrhages. There is, also, generally more or less leucorrhœa, in the absence of the sanguine discharge. These losses of blood are attended by their ordinary consequences, pallor of the face, oedema, disorder of the digestive organs and all the symptoms attendant on anemia. Hemorrhage is one of the most common symptoms attendant on polypi, whether con-
tained in the uterus or the vagina. It is also very frequently present in the cases of fibrous tumors embedded in the uterine walls; and there are some cases wherein there is no hemorrhage, at least for a long time, after the polypi have commenced to grow.

Levret and some of the older authors believed that there was no hemorrhage attendant on polypi, while contained within the uterus, but they had evidently mistaken the exception for the rule. I have, however, known at least one remarkable instance, in which there was no material hemorrhage, until after the polypus was expelled into the vagina.

When there is little or no hemorrhage, there is generally more leucorrheal discharge.

There is often as much, and sometimes very much more bleeding from a very small than a large polypus. This is positive proof that the bleeding is not always or altogether from the polypus; for if so, it ought to be in proportion to its size.

Polypi, doubtless, induce a very vascular condition of the uterus in the vicinity of their origin—a congestion and determination of blood to that part, similar to what occurs at the time of menstruation.

And this, I verily believe, is at least the principal source of the hemorrhage, although it may sometimes take place from the polypus or its mucous covering. Formerly, I supposed the bleeding was from the polypus itself, because when the polypus is removed or ligated, the bleeding ceases, but this results from the fact that when the polypus is removed, or its life destroyed by ligation, it no longer excites that irritation which causes an afflux of blood to the uterus. They often cause more hemorrhage, while contained in the uterus than after their expulsion into the vagina, an unanswerable proof that it depends on the irritation they cause while internal; for if the hemorrhage was mainly, or altogether from the polypus itself, it ought to be restrained, while compressed by the uterus and much freer
after the compression is removed by its expulsion into the vagina.

After fair and ample discussion of the subject, Dr. Lee arrives at the conclusion, "that the hemorrhage arising, in these cases, may be attributed to the very vascular state of the mucous membrane, at the insertion of the polypus with the uterus; that the veins of the parts are the principle sources of bleeding, and when the mucous membrane is absorbed, the vascular net-work which envelopes these growths may add materially to the result. Even when the mucous membrane is uninjured, this envelope may materially increase its vascularity."

Diagnosis.—A vaginal examination is essential to diagnosis. But when the polypus is contained within the uterus, a digital and even a specular examination will often throw little or no light on the subject. The uterus will feel larger and heavier, but to determine the cause of the increased size and weight will require further investigation. The speculum, especially with the aid of the speculum forceps to open the os, will sometimes reveal the existence of small polypi in the cervical canal, which the finger had failed to detect, or to afford a satisfactory idea of their form, size, &c. When the polypus is in the cavity of the womb, and the cervical canal not patulous, these means are totally inadequate; and a certain diagnosis would be impossible, were it not for other methods of exploration, for which the profession is indebted to the genius and enterprise of Prof. Simpson, of Edinburgh. I have reference to the uterine sound and the dilatation of the canal of the cervix by sponge tents. But a consideration of these valuable means of diagnosis must be deferred to another lecture, as we are now concerned with affections of the cervix, not of the body of the uterus.

After the polypus has descended into the vagina, the di-

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*See T. Safford Lee, on uterine tumors, page 44.
agnosia is generally easily enough made out by a vaginal examination. Dr. T. Safford Lee says "when a polypus is found in the vagina, it is known by its being a smooth, hard, and generally an insensible tumor. This last character, however, does not apply to all cases. When the polypus is formed by a tumor of the uterus, it may possess great sensibility. This is greater when the pedicle is thick, and becomes very great when a "muscular layer of the uterus covers the growth." If a polypus is attached by its pedicle to any portion of the body or fundus, the mouth of the uterus will form a soft ring all around the pedicle. If attached to the cervix, the finger cannot pass all around the pedicle. If attached to the os itself, the pedicle does not enter the uterus at all, but the portion of the lip from which it arises seems to extend into the pedicle.

We cannot conceive how a polypus in the vagina can possibly be mistaken for pregnancy, but an abortion slowly taking place might, by an inexperienced person, be mistaken for a polypus; thus if the membranes were containing a firm clot of blood, or some round portion of the foetus, as the head, &c., were to protrude and remain some time stationary, without a knowledge or suspicion of the existence of pregnancy, such a presentation would not appear very unlike a polypus. There might possibly arise some difficulty in distinguishing between pregnancy and an internal polypus, but that does not appertain to our present subject. The absence of all the signs of hernia would distinguish a polypus from this affection. A vaginal hernia, too, I believe, is extremely rare.

Vaginal cystocele or prolapsus of the bladder into the vagina, or through the vulva, is of much more frequent occurrence than vaginal hernia of the intestines. I have known such an error, but the diagnosis is easily determined by the variations in the position and size of the tumor, becoming large and protruding through the vulva when distended with urine; again becoming small and receding after micturition, by its softness and elasticity, and by its
being covered by the mucous membrane of the vagina. But if any doubt were to remain, it could be readily removed by the catheter, which, instead of passing as usual upwards behind the symphysis pubis, would descend into the tumor and cause it to disappear, by evacuating its contents. It will be extremely difficult, sometimes, to distinguish polypi from certain malignant polypoid outgrowths of the uterus, especially when the former are in a state of ulceration. In general the absence of the peculiar symptoms of malignant disease will suffice, but in some instances, so many of those phenomena are present, that the distinction can only be made by the microscope, determining the presence or absence of cancer cells.

A polypus may be distinguished from a cauliflower excrescence by its greater smoothness and density, and generally by not bleeding when examined by the finger; but if one were mistaken for the other, it would not be important, as removal in either case would be proper. In cauliflower excrescence, however, no portion of the pedicle ought to be left, as it would be likely to grow again, and sometimes, at least, it assumes a malignant form.

Prolapsus and procidentia uteri and the different flexions and versions, except inversion, could not, we think, be easily mistaken for polypi, for if a digital examination were to leave a doubt, it would certainly be dispelled by inspection if external, or by the speculum if in the vagina.

Between polypus and inversion, the history of the case will, in most cases, decide, especially when of recent or sudden occurrence; but when the case has come on slowly and imperceptibly, and has become chronic, and no reliable history can be obtained, the diagnosis will sometimes be extremely difficult. A polypus is generally smooth and insensitive, whereas the inverted uterus is rough and very sensitive, but as we have already said some polypi possess sensibility. If the finger fail to decide between polypus and inversion, the point may be determined satisfactorily by the uterine sound which, if it be polypus, would pass by the
tumor, through the os uteri, the usual length of $2\frac{1}{2}$ inches or more; but if inversion, it could not enter the os at all, and could pass very little way into the vagina.

If the question were to arise soon after delivery, the absence or presence of the uterine globe in the hypogastrum would be strong proof for or against inversion; besides the symptoms of inversion occurring at such a time are usually well marked, and most decided, sudden collapse, severe pain, hemorrhage, &c. In inversion, if a male catheter be introduced into the bladder and the end turned downwards, it might be felt by a finger introduced high up in the rectum, but could not be felt if the body of the uterus were in its proper place, intervening between the extremity of the catheter in the bladder and the finger in the rectum.

A polypus and inversion may exist together, the former being the determining cause of the latter, less perhaps by its weight, than by exciting the uterus to strong and long continued contractions for its expulsion. The polypus ought to be removed as quickly and easily as possible, and means promptly adopted to correct the inversion if practicable.

Other methods are suggested by authors to determine the diagnosis between a polypus and an inverted uterus, but as they are uncertain and unreliable, we will pass them by.

There are some polypi, which, though internal, occasionally protrude, and are therefore sometimes perceptible and at other times not discoverable to the sight or touch. The diagnosis in such a case might require repeated examinations. This ought to make us guarded in our opinions in cases wherein although the symptoms indicate a polypus, its presence cannot be readily detected.

The principal danger to be apprehended from polypi depends immediately, or remotely, on the hemorrhage, almost always consequent on them, that is from either the direct effects of the loss of blood, or the impairment of health consequent on the long continued or oft repeated drain on the constitution.
But other bad effects sometimes result. They may prevent conception, or they may interfere with the regular process, or the safe termination of gestation. There are, however, exceptional cases in which conception is not prevented, nor is gestation or parturition materially affected by their presence, even when large.

At the time of labor, a large polypus may obstruct the passage of the child or may cause dangerous flooding, by preventing the regular normal contraction of the uterus. We have already had occasion to refer to inversion of the uterus consequent upon the presence of a polypus. They are said sometimes to contract adhesions to adjacent parts, or by pressure, to cause ulceration through the rectum or bladder. They sometimes cause constipation, retention of urine and severe pains in the back and pelvic region, especially during their expulsion from the uterus into the vagina, and sometimes from the vagina through the vulva.

TREATMENT.—Besides the employment of such remedies as may be indicated to restrain hemorrhage, and to improve the general health, the treatment of polypi consists in the use of the different methods devised for their removal. These are caustics, tortion, or avulsion, ligation and excision. The first two are principally applicable to the removal of the small polypi, although some of the larger, having very small pedicles, may be torn or twisted off, and are sometimes thus detached when not intended. Caustics are very seldom used, but some of the small and soft polypi, found in the cervical canal, may be destroyed by the stronger caustics, such as caustic potash, potassa cum calce, or the actual cautery. They are, however, more promptly and easily torn off by a suitable pair of forceps, or cut off by a long slender pair of scissors; or if not torn off or cut off, they may be crushed and destroyed by the forceps.

Some of the softer polypi, though of considerable size, may be twisted off by the fingers, or may be drawn away by a ligature applied around them as high up as practicable, by means of Gooch's double canula.
The most convenient and advantageous mode of operating on these small polypi within, or attached to the cervix, is to introduce a glass mirror speculum, by which they may be brought into view, and then nipped off by the scissors, or twisted off by the forceps, passed through it. It is advisable, after their removal, always to apply nitrate of silver to the cervical canal, for the threefold purpose of more thoroughly destroying their pedicles and subduing inflammation which is very often coexistent, of also of preventing or restraining hemorrhage. Excision by the scissors is far preferable to torsion or avulsion. Soft polypi of large size according to my own experience, are of rare occurrence. Two are all I remember to have seen. One I saw, in consultation with Dr. McKie, in Edgefield District, S. C., May 11th, 1855. The patient was a negro woman about thirty years of age. The polypus was rather larger than a hen's egg, very soft, feeling somewhat, to the touch, like a small placenta; it had been attended with considerable hemorrhage; its attachment was within the os tinece. I succeeded in detaching and bringing it away by my fingers. There was no hemorrhage after its removal, and the patient rapidly recovered good health. The other case, I saw in consultation with Dr. S. B. Simmons, in this city. The subject of it was an old mulatto woman, about sixty years of age. This polypus was four or five inches long, and about an inch and a half in thickness. It was very soft; this was attached within the os. Dr. Simmons applied a ligature to it, by means of Gooch's double canula, as near the uterus as practicable, intending to draw it through the vulva and cut it off, but its attachment was so frail, that it separated on very gentle traction, and came away with the ligature. Dr. Simmons had, some months previous, removed a large fibrous polypus from this patient, to which case we will have occasion to refer again, after having made some remarks on the removal of fibrous polypi.

[TO BE CONTINUED.]
ARTICLE III.

Laudanum an Antidote to Stramonium Poisoning. By A. G. Emory, M. D., of Roanoke, Ala.

Was called, on the 15th of October, at night, to a mulatto boy, aged five years, who was supposed by runner to be having fits.

After my arrival I learned that, in the evening, an older negro had given the boy a handful of the shelled seed of Stramonium to play with, as he said, thinking them harmless. There had been an elapse of some hours (four or five) after this before I saw the patient, who was laboring under delirium of a lively, active, vivid character, alternating, in short periods, with the most apparent horrified fright; seeming to dread the approach of some imaginary monster, and giving utterance in the most piteous appeals for help—protection. His hearing was obtuse at times; at others, natural. Pupil dilated to almost full size of iris; tongue, mouth and fauces dry, with considerable difficulty in deglutition; heat of surface elevated and dry; pulse and respiration somewhat quickened (not more than could be accounted for from the fright and violent muscular actions it had, which actions were very irregular.) The patient seemed to me to have very little control over the movements of the upper and lower extremities.

From the circumstances, that the child had the seed, and the symptoms above, I was at no loss in forming a correct diagnosis—that of Stramonium poisoning. Actuated by this, I immediately administered an emetic of Ipecac, though with some difficulty, from spadmodic action of muscles about the throat at each attempt to swallow. This emetic brought up a little mucus and persimmons.

Ordered an enema of warm water, strongly impregnated with salt and soft soap, which produced a small fecal evacuation. Having noticed, previously, in your journal, an account of this poisoning successfully treated with small and often repeated doses of laudanum, I determined to test its
efficacy in this case. I commenced by giving three-drop doses, when, seeing no amelioration in the symptoms, I gave seven or eight drops, and in one hour the child was enjoying a calm and profound slumber.

Being called off at this juncture, I left a powder of calomel and rhubarb, to be given as soon as the child should wake, with instructions to re-commence with the laudanum in three-drop doses every hour, should there be a return of former symptoms, until relieved or sleep came on. Patient slept three hours and, on waking, there was a return of the same symptoms slightly ameliorated. The cathartic dose was given and laudanum resumed as directed; but before the second dose was given, voluntary emesis occurred, which brought up a great many seed, and in no great time, discharges, per rectum, showed that they were not in the least afraid to "follow suit," as they produced a teaspoonful of the "little fellers."

Laudanum, in the meantime, being continued, soon brought rest to the little sufferer again; after which there was no return of unfavorable symptoms, except some unsteadiness of gait and imperfect vision, from dilated pupils, which continued three or four days and left the patient well, thus giving an unmistakable demonstration of the therapeutic antidotal power of opium over strammonium.

ARTICLE IV.


Linday, (negress), act 24, (belonging to C. G.,) confined September 12th, 1860. Labor natural, easy and of ordinary duration. Convalesence progressing normally up to the 19th. At this time she was seized with chills about 8 a.m.; at 3 p.m., I saw her with the following symptoms: Fever; pain in lower portion of abdomen, extending upwards; in-
Umbilical Haemorrhage.

creased on taking long inspiration, or on pressure; pulse 125; respiration 36; expression of countenance anxious; tympanitis well marked; lochia scanty, but not offensive. I abstracted twenty ounces blood, when the premonitory symptoms of syncope appeared. In fifteen minutes she was in gentle perspiration and pain very much relieved.

Ordered Hydrary, Gub-mu, grs. ji, pulv. opi. 8½, every two hours, which was continued with an intermission of two doses at night, up to 9 a.m., 20th. I found her so well that the medicine was stopped, and ordered castor oil j5, and opium gr. j at night. Patient was discharged and convalesced finely. The post-blood-letting debility required no tonic or stimulants.

I have been induced to write out this case from seeing two reported in the New York Medical Times, treated by infusion of digitalis, in Bellevue Hospital, so as to show the superiority of the lancet over other means. The first case was under treatment from August 3rd to 17th, when convalescence began. The second, from August 4th to 13th. The opposition to the lancet, and the endeavors to find a substitute for it in that Institution and others, are turning many from the path of nature.

Umbilical Haemorrhage.—In the Charleston Medical Journal and Review for November, Dr. A. N. Talley reports three cases of this unfortunate and troublesome accident. The first two were treated in the usual manner, not omitting the plaster of Paris recommended by Dr. Churchill. Remedial means were ineffectual, and both patients died. The third case was treated with Squibb’s liquor of the persulphate of iron. “The effect was instantaneous; the haemorrhage, which, despite every appliance, had continued fearfully rapid, was at once arrested, and did not again recur. The child is now quite well, and has entirely recovered from the prostration consequent upon the excessive loss of blood.”

This one case is not sufficient to establish the merits of the agent employed; but as the result was characteristic and in keeping with its well-known properties, hopes may be entertained of its usefulness in these formerly intractable cases.

From a great number of cases which have come under the author’s observation, he draws the following conclusions:

1. That the saccharate of colchicum, prepared with the fresh juice of the flower, is one of the most reliable remedies which the physician can employ in order to combat the symptoms which depend upon the gouty or rheumatic diathesis.

2. That the curative effects of colchicum are not owing to its irritating action upon the alimentary canal, but to the sedative power of the alkaloids which it contains; and that, consequently, it is of advantage to administer it in fractional and gradually increasing doses, so as to avoid its purgative effect.

The saccharate of colchicum employed by M. Joyeux is prepared with 100 grammes of fresh juice and 500 grammes of sugar, and evaporated to dryness in vacuo. He uses also an extract of the juice of colchicum, evaporated in vacuo, as an external application, directing it to be rubbed on the painful parts. The saccharate is given in the average dose of four grammes per diem, divided into ten parts, one of which is taken every hour.

"Since I have made use of these preparations," says the author, "I have not met with a single case of gout which did not yield to treatment in two or three days. Acute articular rheumatism disappeared in the space of fifteen or twenty days. In subacute rheumatism, without an equally satisfying result, I have witnessed a great amelioration. I have found it of advantage, in the majority of cases, to let the parties take, as adjuvant, an infusion of lime-tree blossoms, containing nitre, in the proportion of two grammes to one litre of tea.

Natural History of Stone in the Bladder.—A fisherman presented, says M. Zennaro, of Chicago, (Gaz. Med Ital., 1859,) symptoms of stone in the bladder at the age of 54, and refused all surgical interference. Seven years afterwards, a fistulous aperture showed itself in the scrotum, and the man was obliged to keep his bed. During the following 14 years five more apertures formed between the scrotum and penis, the patient suffering, in the meanwhile, great torture. When 75 years old, he had suddenly a sharp attack of pain, and during the piercing cries he uttered, calculus weighing 8 ounces escaped from one of the perineal openings. The urine then freely escaped by this aperture; but the man still refused all interference, and put up with this inconvenient mode of micturition.
Rabies as an Epizootic in Early Ages. By Dr. Huseman.

Rabies has found, on more occasions than one, some special historians. Among these may be mentioned Krugelstein, on account of his "History of Rabies Canina and Hydrophobia," Gotha, 1826—an account of which deserves all approbation for the labor spent on it. All writers on rabies canina, however, take their notes of it from modern times—Krugelstein himself citing those only from the 18th century. And yet there were cases in earlier times, which came under the observation not only of contemporary medical men, but also of the chroniclers of those days.

Thus, in the first part of a familiar historical book—"Theatrum Europæum," by Joannes Phillipus Abelinus—(or Gottfried), Frankfort, 1634—we find the following in page 712: "In addition to all the distress, and war, and great famine, which extended over almost every place at this time, still another plague appeared, from harvest to November, 1621, in Rheinthal and the the territory of Appenzoll, and the surrounding country. For, during the previous summer, the bodies of many thus dying having been thrown into the Rhine and then cast upon its shores, the dogs fed upon them; on which account they became mad, and afterwards attacked the cattle in every direction, and destroyed them. The loss of the people in this way was estimated at 25,000 gulden. At last they were obliged to turn out with spears, rifles, and poles, and destroy every animal thus affected.

"At this period, the trees, as in spring, both in these and in other places, blossomed, and the birds laid their eggs and hatched forth their young.

"In Siebenburgen the dogs also run mad, and not only bit cattle, but even men, causing them to go mad; so that they were obliged, with great labor and grief, to put such infected men and cattle along with the dogs, out of the way, to prevent still further misfortune and peril, which could not otherwise be avoided."

It is worthy of remark, that Siebenburgen was specially affected, since, according to Beecher's statistics of the Austrian Empire, it still suffers, most of all the provinces of the empire, with rabies. That, in the year 1621, men affected with rabies "were put out of the way to prevent still further misfortune, and peril," is perfectly credible, when we think of the manners of the age and the country.
The erroneous idea, that rabies, canina arose from devouring dead bodies, was extensively believed in the 17th and 18th centuries, and even finds an expression in the laws of the time. Thus, in the "Laws of the principality of Lippe," vol. iii, 10, the following circular may be found relating to the interment of dead cattle:

"As it is reported that the required interment of dead cattle has been neglected in some parts of the country, and in others it is not made deep enough, so that the dogs can dig the carrion out of the earth, eat it, and become mad; the authorities will take care to have a more strict compliance with the edict of May 4, 1779, and bring those violating it to punishment."

That, by the consumption of carrion, a true epizootic might be produced in dogs, which should have a great resemblance to contagious rabies, later investigations have shown.

In the other volumes of the European chronicles of Abelinus (the work is in 16 volumes) which Dr. Huseman has examined, he finds no record except that of this epizootic, among the dogs in the 17th century. But the misdeeds of wolves, that had gone mad, are recorded in various years. Thus, in 1651, it is stated that in Cologne, on March 31, a wolf, having lately gone mad at Ververs, destroyed twelve men before he could be slain. In his throat there was found a large piece of fresh human flesh, which might have been from a soldier of Lothingia, as these were lying unburied in quantities in that region. In the woods or forests between the Italian States of Pisa and Luca, six large, fierce wolves were seen together, who had become so famished that they not only attacked sheep and other flocks, but also their shepherds and herdsmen, destroying twenty of the latter. Hence, the Grand Duke of Florence despatched his upper master of the chase, with all his dogs and 400 soldiers, to exterminate these wolves, but they were not to be found.

Similar wolf stories are related of Bohemia, Erfurt, and Touraine, in the years 1652, 1653, and 1671, which cannot here be discussed, since they possess no special interest, and the proofs alleged, merely illustrate the characteristics of the style employed in the "Theatrum Europeum."
A New Test for Diabetes. By E. C. Bidwell, M. D.

The only test for glucoseuria which I have hitherto found satisfactory—fermentation—has involves a delay which is often exceedingly annoying, and sometimes fatal to a satisfactory and seasonable diagnosis. Those founded upon the reduction of metallic oxides, besides being complicated and inconvenient for clinical use, are liable to various fallacies. A better test than any I have seen described, seemed to me a desideratum—one which should be delicate and conclusive, and at the same time ready and convenient. Moved by this sense of a want, to experiment for a new process, I have discovered one which seems to meet fully the needs of the case; one, which, if it be not pre-eminently scientific, is nevertheless facile and reliable. For the benefit of any others who may have felt the same want, I herewith communicate the result of my investigations.

Technically described, it is simply the conversion of the saccharine element of diabetic urine into caramel by heat. My mode is this. Upon a clean slip of tinned iron, place one or two drops of the suspected material, and hold it over a spirit lamp: the fluid will speedily evaporate, leaving, if the process be arrested at that point, scarcely a trace upon the metallic surface. Continue the application of heat; in a few moments after the desication is complete, a spot of an inch or so in diameter, over which the drop had spread with the first ebullition, will gradually assume a rich reddish-brown color, with a brilliant lustre, as if coated with a film of varnish or Japan lacquer. A strong heat produces a darker color, but the lustre continues till the heat becomes sufficiently intense to decompose the substances.

This experiment has succeeded perfectly in my hands, when the urine on trial, previously known to contain glucose, was of specific gravity less than 1030, and still further reduced by the addition of three or four times as much of water. It is thus proved to be a delicate test. I suppose it to be conclusive, also, for I have never yet found any other constituent of urine, normal or abnormal, capable of producing anything at all like the same appearance under the same treatment. The nearest approach is this: some samples of urine not diabetic, when treated in this way, leave a faint, dull, yellowish stain, easily distinguished from caramel by its paler color, and the entire absence of lustre. I need scarcely add, that a solution of sugar, not diabetic, exhibits almost exactly the same reaction.
With the augmented interest attached to glucosuria, since, besides being a leading feature of a most intractable, but fortunately rare, disease, it is found symptomatically associated with several other diseases and injuries, an increased facility for its detection is almost a necessity of the profession. I trust they will find it in the simple and beautiful experiment above described.

**Action of Different Medicines on the Mental Faculties. By Professor Otto.**

All stimulant and exciting medicines increase the quantity of blood sent to the brain. If this quantity exceeds a certain amount, then most of the faculties of the mind become over-excited. Nevertheless the degree of this action is observed to vary a good deal in different cerebral organizations; and it is also found that certain stimulants exercise a peculiar and characteristic influence upon special or individual faculties. Thus ammonia, and its preparations, as well as musk, castor, wine, and ether, unquestionably enliven the imaginative powers, and thus serve to render the mind more fertile and creative. The empyreumatic oils are apt to induce a tendency to melancholy and mental hallucinations. Phosphorus acts on the instinct of propagation and increases sexual desire; hence it has often been recommended in cases of impotence. Iodine seems to have a somewhat analogous influence, but then it often diminishes at the same time the energy of the intellectual powers. Cantharides, it is well known, are a direct stimulant to the sexual organs, while camphor tends to moderate and lull the irritability of these parts.

Of the metals, arsenic has a tendency to induce lowness and depression of spirits, while the preparation of gold serve to elevate and excite them. Mercury is exceeding apt to bring on a morbid sensibility, and an inaptitude for all active occupation.

Of narcotics, opium is found to augment the erratic propensities, as well as the general powers of the intellect, but more especially the imagination. Those who take it in excess are, it is well known, liable to priapism. In smaller doses it enlivens the ideas and induces various hallucinations, so that it may be truly said, that during the stupor which it induces, the mind continues to be awake while the body is asleep. In some persons opium excites inordinate
loquacity. Dr. Gregory says that this effect is observed more especially after the use of the muriate of morphia. He noticed this effect in numerous patients, and he then tried the experiment on himself with a similar result. He felt, he tells us, while under the operation, an invincible desire to speak, and possessed, moreover, an unusual fluency of language. Hence he recommends its use to those who may be called upon to address any public assembly, and who have not sufficient confidence in their own unassisted powers.

Other narcotics are observed to act very differently on the brain and its faculties from opium. Belladona usually impairs the intellectual energies; hyoscyamus renders the person violent, impetuous and ill-mannered; conium dulls and deadens the intellect, and digiulis is decidedly antiaphrodisiac. Hemp will often induce an inextinguishable gayety of spirits; it enters into the composition of the intoxicating drink which the Indians call bauss. The use of *amanita muscaria* is said to have inspired the Scandinavian warriors with a wild and ferocious courage. Tobacco acts in a very similar manner with opium, even in those persons who are accustomed to its use; almost all smokers assert that it stimulates the powers of the imagination.

If the psychological action of medicines were better known, medical men might be able to vary their exhibition, according to the characters and mental peculiarities of their patients. The treatment of different kinds of monomanical derangement also might be much improved, and it is not improbable but that even a favorable change might be wrought on certain vicious and perverse dispositions, which unfortunately resist all attempts at reformation, whether, in the way of admonition, reproof, or even of correction.

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**On the Detection and Estimation of Phosphorus and Phosphorus Acid.** By Professor Scherer.

Within two years the author had occasion to gather much experience from a number of cases of poisoning animals, and of two men; also from several attempts of poisoning by phosphorus. In one case, the phosphorus from thirty to forty matches, equivalent to half a grain, proved fatal to a woman in forty-eight hours. He establishes the presence of phosphorus by Mitcherlich's method, with the modifica-
tion of filling the apparatus with carbonic acid, generated from a few pieces of calcareous spar introduced into the acid liquid. No luminous vapors are obtained, but little of the phosphorus is oxidized, and if the tube dips into distilled water, this is phosphorescent when agitated in the dark, and its vapor blackens nitrate of silver.

To estimate the phosphorus, the last bottle containing the water is connected with another phial containing either neutral or slightly ammoniacal nitrate of silver, which absorbs all the phosphorus vapors that have not been retained by the water. Any globules of phosphorus which may have been obtained are fused together and weighed; the water is added and then evaporated; the chloride of silver is filtered off: the phosphoric acid, which is contained in the filtrate, is estimated in the usual manner, and calculated for phosphorus.

Very minute portions of phosphorus may be recognized, after first ascertaining the absence of sulphhydric acid, the vapors of which will turn sugar-of-lead paper black, and paper moistened with nitroprussids of sodium blue; papers moistened with nitrate of silver are suspended over the acid liquid, which gently heated; in the presence of phosphorus the silver will be reduced with a black color. The papers may now be macerated in chlorine water or aqua regia; the filtrate will, after evaporation, contain phosphorus acid, to be recognized as ammonio-phosphate of magnesia, or as phosphomolybdate of ammonia.

If phosphorus has been wholly or partly converted into phosphorus acid, the residue from the first distillation is heated in Mitcherlich's apparatus with sulphuric acid and pure zinc, until the hydrogen ceases to be contaminated with phosphuretted hydrogen, which is conducted into the silver solution, and estimated as indicated before.—American Journal of Pharmacy.


The value of the ophthalmoscope is well illustrated in several cases where diagnosis would have been difficult in the absence of this means of assistance. The instrument in fact completed the history of the disease, so far as the eye was concerned, and furnished information which for-
merly could only have been obtained by actual dissection. In Case 1, the patient noticed while at work that there was "a dimness before his sight," and, on closing the eyes alternately, he found he could not see with the left. The next morning the right eye failed in the same manner, and, on further trying the eye, he could only make out very large capital letters. Ten days afterwards vision in his right eye had improved, but in the left it was not materially affected. In strong light he could not see at all. The ophthalmoscope showed traces of effusion from the choroid beneath the retina, at the yellow spot in both eyes, the most in the left. This was a well-marked illustration of symmetrical apoplexy beneath the retina occurring in an apparently healthy man.

Case 2 commenced "as a little dimness like a mist before the eye," followed by the appearance of black spots floating before it. His general appearance on admission was not the blank look of total blindness, but he could find his way in the hospital, only slowly, and not without directing himself somewhat by feeling. The pupils were unusually large, and did not contract by light. He could see better with the left eye. The eyes were examined at the time by the ophthalmoscope, and clots of blood were distinctly seen in the fundus. No marked improvement followed the treatment. Constant headache presented a complication in this case, the pain being chiefly in the forehead.

Case 3 afforded an example of apoplexy of one retina only, but attended with frontal headache and epistaxis. The failure in the right eye appeared to have followed soon after a violent attack of bleeding from the nose. The headaches were wholly relieved by the epistaxis. When last examined, he described his sensations at night as follows: On looking at the ceiling, he sees a large "block," the size of two heads, the rest of the ceiling appeared pretty clear. (The pupils dilated by atroglene.) Upon making an examination of the eye with the ophthalmoscope, a large irregularly circumscribed patch was discovered, extending over and around the yellow spot, the ground of which was lighter colored than the surrounding parts, and on which were numerous dots of extravasation, very irregular, and in many places consisting of five or six spots running into each other. Between this patch and the margin of the optic entrance was found a large and apparently thick coagulum of a deep purple tint. Over the whole of the patch are small white
spots, apparently about the size of pins' heads. Several distinct apoplexies must, in this instance, have occurred at different periods. The whitish patches were, no doubt, those of oldest date. The case is of interest on account of the age of the man being exactly that at which a sister of his had died of cerebral apoplexy, and because in his own case severe frontal headache and epistaxis had preceded the effusion into the eye.

On the Employment of Stearate of Iron in the Treatment of Soft or Phagedenic Chancres. By M. Ricord, (Pharmaceutical Preparations of M. Braille.)

From a communication of M. Calvo, nephew of M. Ricord, we learn that the latter has employed for several months, in the Hopitil du Midi, an ointment or plaster of stearate of iron, prepared by M. Braille, pharmacist of the institution, to whom we are indebted for excellent means of dressing soft or phagedenic chancres.

This new preparation, which can be prepared at a low price, and is of easy application, is destined, without doubt, to render great service in all those cases of so serious a character where the phagedenic action seems to resist the numerous means which science directs against it, and continues its destructive march without interruption. Up to the present time, at least, it has fulfilled, in the hands of M. Ricord, all that it seemed to promise, and has become of daily use in his hospital as well as in private practice.

The modus faciendi of these new preparations, as communicated by M. Braille, is the following:

Ointment of Stearate of Iron.—R. Sulphate of Iron, 500 grammes; Marseilles Soap, 1000 grammes.

Dissolve the sulphate of iron in about 1500 grammes, of water, and dissolve the Marseilles soap in an equal quantity of water. On pouring one solution into the other, a whitish-green precipitate is obtained, which is dried, and then melted at a moderate temperature of 80° to 84° R.; add to the melted mass, on cooling, 40 per cent. of essence of lavender, and stir it constantly until it becomes perfectly cold.

Sparadrap of Stearate of Iron, (Braille's Plaster.)—R. Stearate of Iron, q. s., obtained by the process directed above.

Melt it at a moderate temperature, and spread it on muslin.
like the ordinary sparadrap. This mass gives an adhesive sparadrap, which does not crack like the soaps of lead obtained by double decomposition.—*Journal de Pharmacie.*

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*Hydrochloric Acid in Chronic Dyspepsia.* By Dr. Schottin, of Dresden.

Dr. Schottin has used hydrochloric acid with great success in cases of chronic dyspepsia. The curative effect of the remedy is attributable to two circumstances: First, it suspends, like other powerful acids, the process of fermentation; and, secondly, it serves to dissolve the proteinaceous compounds, being, to a certain extent, a substitute for the disturbed secretion of the gastric juice; it is therefore, the most natural remedy. In children who suffer from gastric and intestinal catarrh, the author prescribes the acidium muriaticum dilutum of the Prussian pharmacopoeia, in doses of six to fifteen drops, in a mucilaginous mixture, and adds, until the bowels are regulated, a few drops of tincture of opium. He orders the medicine to be taken half an hour after each meal, and confines the patient to a diet of milk and broth. In old age, when the strength of the system is gradually falling, disturbances of digestion are very frequent, the cause of which is to be found, in many instances, solely in a diminished secretion of the gastric juice. A double indication is to be fulfilled in these cases: to arrest the process of fermentation, and to stimulate the stomach, in order to increase the secretion of the gastric juice. Dr. Schottin recommends for this purpose small doses of chloride of sodium and sulphate of quinia, to be followed, a short time afterwards, by sulphuric acid. The chloride of sodium is decomposed by this means into sulphate of soda, and hydrochloric acid. He prescribes ten grains of chloride of sodium and one-third of a grain of sulphate of quinia, to be taken four times a day wrapped up in a wafer, lets the patient drink some water, after it, and administers, about five minutes later, eight to twelve drops of the elixir acidum Halleri in half a wineglassful of water.

The dyspepsia of drunkards requires a double dose of sodium and sulphuric acid. Dr. Schottin attributes the effect of hydrochloric acid in typhus, anaemia, and chlorosis likewise to its property of suspending the process of fermentation within the stomach, and of exciting the deficient secretion of the gastric juice.—*Archiv der Heilkunde.*
On some points connected with the Pathology and Treatment of Prolapse of the Rectum.*  By Henry Smith, F.R. C. S.

It is not my intention in this paper to treat generally of the important subject under notice, but I am going to request your attention to one or two particular points connected with the pathological features of prolapsus of the rectum, and with the treatment which is suited to certain forms of the disorder.

There has not been much room for discussion respecting the main pathological changes which take place in the production of this disease, for the simple reason that a prolapsed rectum can be readily examined on the living body, both by the eye and the fingers, and some most able surgeons have described in their works with remarkable accuracy the principal features; but on one point there has been, and is now, a strong divergence of opinion as to whether most frequently the prolapsed part consists of the mucous and muscular coats of the rectum, or of the mucous membranes simply. Some of the older writers have leaned too strongly to the opinion that the mucous membrane of the bowel alone was involved, while of late there has been an opinion expressed as strongly on the opposite side. There cannot be a doubt in the mind of any one who has investigated the subject by studying morbid specimens taken from the dead body, that, although in the majority of instances the prolapsed part consists of the mucous membrane alone in a relaxed and thickened condition, yet, in some cases, the muscular coat of the bowel is protruded beyond the sphincter as well as the mucous membrane. It is not only an interesting but an important fact to ascertain properly, because it will happen that the treatment which will be adapted for the one the form of disease will not suit the other. In cases where the mucous membrane is prolapsed local measures, and those of a less energetic nature, are sufficient for a cure, whereas in instances where the muscular coat is brought down beyond the sphincter, local measures alone will either fail, or it will be necessary to employ means more decided and more severe. As an illustration of the prolapsus consisting of all the tissues of the bowel I may refer you to those large descents which are

*Read before the South Hants Medical and Chirurgical Society, Sept. 22, 1860. Dr. Wiblin, President, in the Chair.
sometimes seen in children as the result of some irritation in the intestinal tract or in the bladder. We know what a difficulty there is occasionally in keeping up such a prolapsus after it has been carefully returned, and that the best regulated local measures will not suffice for a cure until the general health of the child is improved by nutritious diet and powerful tonics, which especially tend to enhance the power of the muscular system. We know how elaborately the muscular tissues are supplied with blood-vessels, and how largely their nutrition and power of action are under the influence of remedies which increase the tone of the system.

The other instances in which we find that there is protrusion of the entire structure of the bowel are seen in those cases of long standing prolapsus in adults, where the protrusion is of immense size, as large as the fist or a facial head, and coming down on the least exertion of the patient. Within the last week, I have been consulted on a case of this description, occurring in the case of an old gentleman, of a weak frame and feeble circulation. The prolapsus had existed for forty years, and it has reached its present enormous size in consequence of neglect of proper surgical treatment. In such cases as this, there is no doubt that at first, the mucous membrane of the bowel was simply protruded, but afterwards the other tissues became involved, and at length the tumor consisted not only of thickened mucous membrane, but the muscular coat also was extended beyond the sphincter.

In those cases of prolapsus of the rectum of much more frequent occurrence, where the disease is more limited in extent, and where the mucous membrane alone is protruded, there is a considerable difference in the pathological features, and that, too, of considerable practical importance, especially when viewed in relation to a mode of practice I am in the habit of adopting. In some of these cases it will be found that the mucous membrane is simply extended beyond the sphincter, in but a very slightly altered condition, the whole circumference of the lining membrane of the bowel may be down, or only one or two semi-circular folds may be prolapsed; in either instance, however, besides this prolapsed membrane, the protruded part may consist of the muco-cutaneous lining of the sphincter, in a highly congested and thickened condition, forming in fact, the greater portion of the disease. This is protruded first, and may
be seen as a dark blue ring around the anus, while situated above it is the proper mucous tissue of the bowel simply relaxed and prolapsed, but otherwise in a normal state.

There is a point of considerable importance, both pathological and practical, in connection with prolapsus, to which I wish to call your attention, and which has not been sufficiently alluded to by writers; this is the condition of the sphincter ani. In some cases we shall find that this muscle acts in a normal manner and that the anal aperture is not larger than ordinary, although there may be a considerable prolapsus of the mucous membrane; in other instances the sphincter seems to have lost a considerable degree of its contractile power, the aperture is enlarged and easily distended; in a few cases to such an extent that the whole fingers, when formed into a cone, may be passed into the rectum. In these instances this laxity of the sphincter is the chief cause of misery, for when it exists in a great degree the patient loses, either partially or entirely, control over his rectum, and the feces escapes involuntarily. A remarkable instance of this fell under my care in the person of a patient, aged 70, who had suffered for twenty years with prolapsus, and indeed it was this circumstance which drove him to consult me. When there is a partial loss of the power of the sphincter the patient is continually harassed by calls to the closet night and day, although there may be any actual involuntary discharge of feces. Of course this loss of power of the sphincter is the greater misfortune of the two, but in some instances of prolapsus of the mucous membrane when the sphincter is in a healthy condition, the following accident may and does occur, especially when the protruded membrane has on its surface one or more distinct hemorrhoidal tumors, the protrusion occurs on one occasion, to a larger extent and the patient cannot return it as usual, the most severe symptoms of course rapidly set in, and although this accident is very likely to be followed by a cure in consequence of sloughing of the constricted parts, yet one would be very unwilling to bring about this condition purposely, for death has followed upon the intense amount of inflammation which has occurred. Not long since I was called to an old lady, 70 years of age, to whom this accident happened, and not being in a healthy condition she was reduced to a great amount of suffering, for violent inflammation and sloughing of the protruded membrane had taken place;
this latter process was hastened by placing ligatures around the diseased parts, and she made a good recovery.

The treatment which should be adopted in case of prolapse of the rectum must differ according to the pathological condition of the part, especially as regards size and the state of the sphincter. It has hitherto been customary among surgeons to use the ligature in most of the cases of prolapsus requiring surgical operation, and of these I am only now talking: and undoubtedly, where the disease has become very extensive, and particularly when associated with distinct haemorrhoidal tumors, the ligature must be used, if there be not any contraindication to a surgical operation. This is especially the case when, from the large size and the peculiar feel of the tumor, there is every reason to believe that the muscular coat of the bowel is protruded as well, for any operation short of the ligature will be useless in removing the disorder. In some of the cases also alluded to, when the prolapse is voluminous, and there is a very relaxed state of the sphincter, the ligature alone can be depended upon; but for such instances, which are by no means uncommonly met with in old people of the middle and upper classes, I have lately put in practice an operation which I do not wish to claim as particularly new, for it is a combination of two agencies employed before for similar conditions, but which I particularly wish to bring before your notice. It consists in first applying the strong nitric acid, on one or more occasions, to the mucous membrane; and subsequently, when this agent has had some decided effect, to remove with curved scissors narrow strips of skin and mucous membrane from around the verge of the anal at right angles to the orifice. The latter remedy alone was employed both by Hey and Dupuytren, and lately recommended by some; but my experience tells me that alone it is not to be depended upon; but if the mucous membrane, which is always in such cases in an extra-vascular and relaxed condition, is first brought into a more healthy state by the contracting and slightly escharotic powers of an agent like nitric acid, the effect of removing the loose fold of skin which are so generally associated with the relaxed state of the sphincter, is very admirable. Two objects, in such instances, are sought by the surgeons, and indeed are absolutely necessary for an efficient remedy, viz: the contraction of the mucous membrane, and the bracing up of the sphincter: these two results are brought about by the com-
bined proceedings mentioned. I must, however, not omit to state that it is perfectly useless to employ the nitric acid in those instances where the prolapsed mucous membrane has become thined and indurated, as is very often the case: the agent will produce no good effect; both patient and surgeon will be disappointed. The application of the acid is more especially advisable in those cases where the mucous membrane is granular, very vascular, and readily bleeds: the effect of one application in such an instance is sometimes really astonishing. But there is one caution I wish to impress; and that is, that the surgeon must not be misled into the abandonment of further measures because after one application of the nitric acid he finds that the bleeding and prolapsed bowel suddenly disappears. It will sometimes happen that one application will be followed by remarkably good results like these, and that afterwards the symptoms return. It is better, in cases of extensive prolapsus, that the acid should act gradually than suddenly; the effect will be more permanent. It will be necessary to apply the nitric acid when the disease is extensive, on several occasions perhaps four, six, or eight times; but it is generally attended with so little pain, that the patient does not object to submit to it. If the sphincter ani be not in a weak condition, but acts normally, there may not be any necessity of cutting away the thin slips of muco-cutaneous covering; but if there are any pendulous flaps of integument, these should be exercised. These operations, which should be effected by sharp curved scissors, are of course painful; but the application of the freezing mixture of ice and salt will much deaden the pain.

This treatment may be considered as perfectly free from danger, and is so admirably adapted for those cases where the patient will either not submit to the ligature, or where there is some contra-indication to this proceeding. For instance, many of the worst cases of prolapsus occur in aged people who are, or who consider themselves too old to undergo the ligature; others have some symptoms of lurking organic disease about their brain or heart, and it would be highly perilous to use the ligature, but the treatment I advocate may be used with perfect assurance of safety. To illustrate this important fact I will allude to two cases which have lately lately been under my notice. The first was a gentleman aged 73. He had a bad prolapsus, and when told by me that I could only recommend the ligature with
confidence, to destroy his disease, he refused to undergo it. I tried by some applications of nitric acid to remedy it, but he became dissatisfied and consulted a surgeon of great eminence who strongly recommended the ligature and applied it; the patient died three or four days after from an attack of apoplexy.

Now, there were certain indications about this gentleman which would have prevented a surgeon who knew them and carefully considered them, as I had done, from frequent observation of his case, from performing this operation. The patient was very peculiar in his manner and habits, and thought by his friends to be very "strange," as the term goes, and in addition to this he had almost entirely lost the control over his bladder during the few last months of his life, without the existence of any stricture or disease of the prostate.

Now, these two facts indicated some lurking mischief about the nervous system, and should have prevented the surgeon from operating. No doubt the stimulus of the operation of the ligature which is much more severe than is imagined, lit up the lurking mischief in his nervous system and destroyed life. To this the eminent surgeon who performed the operation readily assented when he was questioned by me.

The other instance is that of an old military man, nearly 70, who has had prolapsus with severe pain and bleeding. He was anxious to get some relief; he had a peculiar nervous twitching about his face, and a feebleness of his lower limbs; and on making inquiry of one of his family, I ascertained that he had something approaching a fit on two occasions. I at once decided against employing the ligature, for this reason, and resorted to the employment of the treatment I have advised with great benefit.

It is not to be supposed from the remarks I have made that I am averse to the ligature in suitable cases, but if it can be dispensed with, and a milder mode of treatment can be successfully adopted, the surgeon is bound to put it in force. For, although I believe, when properly performed and in healthy subjects, the operation of ligaturing portions of the mucous membrane of the rectum is by no means dangerous still we cannot conscientiously tell a patient there is no risk; independent of the peculiar danger attending the proceeding, such as pyæmia or tetanus, some serious and annoying
accidents are liable to follow this operation, and I shall here
draw attention to some of these.

One very peculiar and unlooked-for sequence of this op-
eration for prolapsus worthy of relation occurred in practice
not long since. I operated upon a fat old lady who had
not much stamina—the circumstances of the case were such
as to demand a speedy and efficient operation; I used the
ordinary precautions in the process, and the patient did
very well the first day or two. On the third day, however,
to the great surprise of her medical attendant and myself a
severe haemorrhage suddenly took place from the part, and
had such an effect on the patient that it made me very
anxious. I was at a loss to account for this very unusual
occurrence, where neither the knife or scissors had been used;
but on going to make an examination I found that there
had been a rapid slough as large as a shilling formed by
the side of the rectum, laying bare the muscular coat of the
bowel for near an inch in extent, and no doubt one of the
inferior haemorrhoidal arteries had been opened up and
hence the bleeding which was so profuse and which occurred
on a second occasion; but fortunately by keeping up
pressure, and local application of strong nitric acid, the
sloughing process was stopped and the patient made a good
recovery. But this might have destroyed the patient had it
gone on further. The cause of the sloughing was this:
The patient, who was very fat and heavy, lay a great deal
on her back after the operation, and the pressure of the bed
induced the sloughing of the part already of necessity irri-
tated by the close proximity to the ligature. We learn from
this interesting case the importance of not allowing patients
to lie much upon the back after this operation, they should
rather be induced to lie on their side.

There is another point connected with the operation of
the ligature of the mucous membrane of the rectum which
there is considerable divergence of opinion. I refer to the
supposed danger of suddenly arresting the great discharges
which are so frequently seen instances, the sudden arrest of
bleeding, or of a very profuse muco-purulent discharge by
the ligature, is liable to be followed by fatal consequences,
although many erroneous notions have been promulgated
about this. In very robust or full-blooded persons, the sud-
den stoppage of the discharges may predispose to, or bring
on some internal congestions of the brain or lungs; and,
therefore, in such, one should be careful about employing
the ligation. I have never had good cause, in my own practice, to suppose that any serious result of this kind has occurred, but I will briefly detail one case which, if the circumstances had not been accurately investigated, would have led one to the supposition that the operation produced a disastrous result of this kind.

In March last one of the finest-looking officers in the army, of large frame, in robust, ruddy health, and aged 50, consulted me for the prolapsus and haemorrhoids of a severe nature, which had existed for many years. He was a cavalry officer, and had seen arduous service in various campaigns, having to ride much; and for many years, on such occasions, the haemorrhage was very profuse; but—and this is important—there had been scarcely any bleeding for the last two years. I advised the ligation, which operation was also strongly recommended by Mr. Fergusson, who, at my request, was consulted. I performed the operation, which was followed by no untoward symptom, and in the course of seven or eight days, the ligatures had separated, and I left the patient under the care of his medical attendant, Mr. Coleman, of Kingston. The patient was out in a fortnight but did not regain his strength so readily as is the case after this operation; and one night, about three weeks afterwards, he suddenly dropped down dead.

Now, at first sight, one would be inclined to say that here was the very case to prove the danger of suddenly stopping the discharge from the rectum. And had I not investigated the point, I should certainly have supposed that a sudden congestion of the brain had been caused by the cessation of the discharge; but the fact of there having been scarcely any bleeding during the last two years, militates against this doctrine. Mr. Coleman, who is a very able and shrewd practitioner, considered that it was disease of the heart that destroyed life—that the man had a feeble heart, and that the low diet to which he had been of necessity reduced, had further enfeebled it, and hence its action had suddenly ceased. It was a most unfortunate thing that no post-mortem examination could be obtained.

Before I conclude these straggling remarks and imperfect observations, I will make one allusion to the diagnosis of prolapsus of the rectum. It may seem unnecessary to insist upon the importance of making a correct diagnosis, but this surprise will cease when I inform the Society that I lately saw a morbid specimen taken from the body of a dead
woman, where the whole circumference of the prolapsed rectum had been encircled by a ligature, under the supposition that the tumor was a prolapsus of the uterus. As may be imagined, death was the result of the occlusion of the canal. The proceeding, too, was effected by a man of considerable repute.

Time will not allow me to make any further remarks, although there are several other points of interest connected both with the pathology and treatment of prolapsus; but I trust that the few subjects I have hit upon so transiently and imperfectly may be considered worthy of discussion.

Treatment of Inflammatory Affections of the Female Breast.
By W. H. Byford, M. D., of Chicago.

After fully describing the character of these affections, Professor Byford comes to their treatment. He arranges that for inflammation of the nipples under the heads of prophylactic, palliative, and curative. The nipple must be prepared for its duties. The causes operating upon it produce abrasions, and their actions is facilitated by the natural and acquired tenderness of the structures, particularly the epidermis and skin. Hence these must be hardened. The nipple should be covered lightly during pregnancy and nursing; the thinner and more permeable the covering the better. It should freely admit the air. At the time the organ "should be subjected pretty constantly to moderately rough friction."

An excellent dressing for the nipple for the last two months, is a rough, coarse sponge, so cut as to cover the areola; surround and cover loosely, but touch every part of the nipple. Over this there should be but one thickness of clothing, so as to allow of the evaporation of fluid as fast as secreted, and the free admission of air. In cold weather, of course, the parts should be covered more when going out. The nipple should be occasionally moistened with water, and allowed to dry slowly; friction with a dry towel or the fingers will assist.

During lactation, the same rules should be observed, and after nursing, the nipple should be wiped clean and dry before being covered. A little glycerin or olive oil will prevent cracking. When inflammation comes on, palliatives and curative measures are demanded. The healing process being continually interrupted by the performance of
the functions of the organ, it is necessary to protect the part from the effect of these interruptions.

Artificial means are required, which intervene between the mouth of the child and the nipple. For this purpose the shield must be employed. This should be made in the form of a conical hat, having a rim, a crown cavity, with a draught tube rising out of the top for the passage of the milk. This rim should be large enough to cover the areola, the crown passing over the nipple, merely touching it on the sides. If the abrasions are on the summit of the nipple the shield should be so deep that, when drawn, the top of the organ will not touch, or else it will cause pain. But if the cracks are on the side or base of the organ, then the cavity of the shield must be shallow, so that the top of the nipple touches its bottom in such a manner as to prevent any stretching, and to bring the pressure entirely on the top. In this latter case, the bottom of the cavity should be as smooth as possible, and correspond in shape to the summit of the nipple, in order to prevent unequal pressure. A soft linen rag, properly adjusted over the draught tube, is preferable to any other envelope.

M. Legroux mentions the following ingenious contrivance. He applies this mixture:

R. — Collodion, p. xxx;
Ol. Ricini, p. ss;
Ol. Terebinth. p. jss.

This is quite adhesive, and dries less quickly than collodion, on the areola with a brush, so as to encircle, but not touch, the nipple for the width of an inch. While yet soft the nipple is covered with gold-beater’s skin, which is pressed well down upon the mixture. Thus is formed a smooth and pliant covering. Holes are pricked through the skin with a needle, to allow of the passage of the milk. Before sucking, this must be moistened with sugar and milk.

The curative means for sore nipples are various. The same will not do for abrasions as well as ulcerations. Nature is to be imitated by forming a cuticle for the part.

Abrasions may be covered with starch and mucilage. The following is a good mixture:

R. — Ceret. Alb. 5ij;
Ol. Amyg. Dule. 5ij;
Mel. Despun. 5ss. M.

Dissolve with gentle heat, and add Bals. Canad 5ijss.
Apply each time of nursing. When the cracks are deep, close them by pressing their edges together, and cover them with collodion in a thick and wide coat; this must be renewed when found necessary. When ulceration exists, it will be acute or chronic. Act as for this affection elsewhere. Deplete, if acute, by leeches, and apply cold emollient poultices; or envelop the nipple in a thin layer of thick mucilage, covered with oil-silk, so as nearly to fit the organ, keep cold by ice applied in a bladder. When these remedies are not necessary, apply mucilaginous and bland ointments applications. Alum and tannin are good at first; sulphate of zinc and borax came next in respect to time. On scruple of tannin to one ounce of rose-water, five grains of alum, or sulphate of zinc are useful in the early stage when the acute symptoms are subdued. The following are useful:

R.—Sodæ Subborat. 5ss;
Glycerin, 5ij;
Aq. Rosar. 15jss.
M. Use as a wash after sucking.

R.—Sodæ Subborat. 5ij;
Cretæ Præp 3i;
Spts. Vini,
Aq. Rosar. aa 15ij.
Mix and dissolve.

The latter may be used when the ulcer is becoming indolent. In the chronic form strong astringents and stimulants become necessary. A skillful use of the sulphate of copper and nitrate of silver will shorten the course of these ulcers. The latter applied solid to the surface, not oftener than once in eight days, is excellent. In the interval the sore may be dressed with tannin or alum in solution. When irritable, an ointment may be used, made of belladonna, hyoscynamus, or opium. One very good expedient, which will often entirely change the character of the ulcer, is to anesthetize the part with ice, as practiced prior to operating.

When the lymphatic glands become affected, antiphlogistic measures must be employed; and when chronic, alteratives, tonics, liniments, etc., according to the peculiarities of the case. The treatment of milk abscess is of great importance. It should be prevented if possible, by proper management at the outset. When the nipple is deficient, or, from any cause, apprehension is deemed
possible, it is decidedly improper to attempt nursing. In other cases, prolonged and judicious efforts should be made to render the organ useful. The first thing is to take perpendicular pressure off the top of the nipple, by some device to prevent the dress from forcing it in, and this, if possible, should be commenced early in pregnancy. For this purpose a shield should be employed, which will cause a pitting of the anterior surface of the breast, and a projection of the nipple. When called upon to treat a rudimentary nipple, after parturition, the effect must be more prompt. In many cases the organ may be made available by causing it to erect itself by simple titillation by the finger, and immediately applying the child; or by placing a thick layer of collodion, around it on the areola, which, drying, elevates the nipple. Then, by keeping the reservoirs empty, abscess is prevented. To aid in this, we have various tubes and pumps, but all of which are objectionable. A puppy is often used, but it likewise is liable to irritate and excrinate the nipple. The only proper way is by the mouth of an adult, varying the pressure of force to suit the tenderness of the part.

A very useful class of measures are those to suppress the secretion, and thus relieve the distention, as opium in large doses, or applied as an ointment; but belladonna seems to have acquired most renown. Numerous instances are reported of its great value in such cases. Much depends upon its strength and application by inunction till the production of its characteristic effect upon the system. Cold, as a local remedy, is beneficial. The temperature of the breasts for this purpose should be kept steadily at about 40 or 45°, as by water running through an india-rubber enveloping the organ, or the application of a bladder. No bad effects are to be apprehended from it. Internally, a saline cathartic may be given every other day, and two grains of iodide of potassium every four hours will materially assist.

Acute inflammation, the effect of congestion, is apt to be extensive, and will require energetic treatment. Warm fomentations may be applied for the first few hours with the hope of establishing the secretion of milk. A decided venesection will often turn the balance in favor of resolution. Immediately after this, the use of the veratrum viride may be commenced in doses of six drops every four hours, till the pulse is brought down below the normal standard, and kept there. One grain of calomel, with a quarter of a
grain of sulphate of morphia, may be given, if the pain is urgent, say every four or six hours. A lotion of one part of sulphuric ether to two parts of alcohol will be a good soothing adjunct, after the inflammation becomes permanent. These measures should not be abandoned for warm poultices until suppuration is clearly evident, by which plan we may often limit the extent of this process. In this state of the gland, the most moderate means only should be employed to draw the breast. Retained milk is not the cause of inflammation here, as in milk abscess. If glandular inflammation is complicated with that of the reservoirs, the treatment for both must be combined, as local and general antiphlogistics with means to arrest the secretion and empty the reservoirs.

Chronic inflammation will be cured by treatment similar to that for other glandular inflammations, as leeches, mercurials, iodine, and vegetable alteratives, internally and externally. Much reliance can be placed upon well-regulated pressure with adhesive straps, pressing the diseased part against the ribs; or with collodion thoroughly incasing the breast. When pus forms, evacuate it early, though where the abscess is deep, it is desirable to wait until the pressure from within has caused condensation of the overlying tissues otherwise a large opening will be required. In milk abscess the earlier and smaller the opening the better. The effect of suppuration and evacuation of a milk reservoir is often to destroy its cavity, but in some cases a milk fistula is formed. This may be closed by an occasional application of the nitrate of silver. Worse than these are the tortuous lacunae, that sometimes result from the deep glandular abscess of the breast, and which are generally very difficult to cure. Injection of iodine is most to be relied upon. This may be done by inserting a soft, flexible catheter to the bottom of the canal and throwing the injection through it so as to apply it without dilution to the bottom of the fistula. This favors the shallowing instead of the narrowing of the cavity. Of course it is never advisable to slit up these obstinate puriferous ducts, because of the amount of tissues that might be damaged, which it is desirable to save.—Chicago Med. Exam.
A Case of Leucocythæmia. By Dr. George Sheaber, Resident Physician, Royal Infirmary, Edinburgh.

A young man aged twenty-four, a miller by trade, admitted to the infirmary under the care of Dr. Gairdner, affords an interesting illustration of leucocythæmia. Three weeks elapsed from his admission to the time of his death, and "the following is a summary of the facts of the case in regular sequence: Anaemia, languor and debility; epistaxis; headache; bleeding from the gums; renal pain, with lithiasis; febrile symptoms; disappearance of lithic acid, and appearance of lithates and albumen; diarrhoea; re-appearance of lithic acid; uncontrollable epistaxis; haematemesis; otitis; exhaustion and death."

The crystalline deposit in the urine, on third or fourth day after admission, consisted mainly of hexagonal crystals of the lithic acid, with a few of the ordinary rhomboidal crystals. These, we have already said, afterwards disappeared. Post mortem examination revealed leucocythæmia, enlarged spleen, fatty liver, petechiae on the mucous membrane of stomach and on the serous surfaces of the pericardium and endocardium.

The case detailed by Dr. Sheaber gives him a field for reflection, which he discusses in the following suggestions:

1. Enlargement and activity of the spleen is not the only condition involving increase of the white corpuscles, there being at present a case in the infirmary in which this condition of the blood co-exists with enlargement of the whole lymphatic system - of glands, without detectable enlargement of the splenic organ.

2. The fact of a great excess of white corpuscles in the blood of cases of leucocythæmia being accompanied by constant diminution of the red discs, appears to militate against the theory put forward by Wharton Jones, and supported by Bennet and others, that the latter are derived from the former by liberation of their included nuclei; for, according to their theory, increased activity in the formation of the white ough, pari passu, to be attended by increased development of red discs, while the reverse is the case. Comparative increase of the white corpuscles is seen in a variety of organic diseases, especially chest affections; but it also occurs in dysentery, diarrhoea, paraplegia, etc.; in all of which one general condition was observed, viz: depreciation of the appetite, and emaciation. These facts, Dr. Shearer thinks, point to the blood itself as the primary
source of origin of the red discs, and in the diseases mentioned there is either a deficiency of nutritive pabulum taken into the blood for the production of the red corpuscles, or these are rapidly melted down to supply the elements of the discharge. In leucocytæmia, again, the nutritive pabulum is appropriated for the formation of the white corpuscles, the blood being thereby impoverished to the extent to which these are increased; development of the red discs is consequently kept in abeyance, and anaemia is again the result.

3. The deficiency of color in the urine and the salts obtained from it depends probably upon the same cause as the pallor of the general surface, viz: deficiency of red globules and hæmatin in the blood.

4. Careful study of the deposit of lithic acid seemed to warrant the inference that the common or lozenge-shaped crystals is derived from the perfect hexagonal form by shortening of the lateral planes of the latter; but this does not explain the formation of the true rhombic crystal, which is an irregular form,

5. Hemorrhage from various mucous surfaces form as prominent feature of this disease, and may depend partly upon the increased tension maintained in vessels by the absolute increase of volume in the mass of the blood, and partly upon the imperfect nutrition of the walls of the capillaries from the inferior quality of the blood for histogenetic purposes.

6. The white corpuscles, we know, are closely allied to fibrin in composition and character; fibrin is increased in febrile and inflammatory diseases, and accompanying this is an increased elimination of lithic acid, or lithates, by the kidneys. Can any relation exist between the lithuria present in this case, and the increase of white corpuscles in the blood?

On Santonin. By Prof. F. Falck, of Marburg, and Drs. V. Hasselt and Reinderhoff.

Professor Falck communicates in his treatise the result of fifteen experiments made by himself and Dr. Manns, with the view of investigating the physiological effects of santonin. The conclusions at which he arrives are the following:

1. Santonin and santonin-soda are poisons; at the same
time it is not to be denied that they are valuable remedies.

2. A solution of santonin in dilute alcohol, introduced in proper quantity directly into the blood, rapidly causes the death of a dog, and undoubtedly also that of any other animal.

3. Injected into the subcutaneous cellular tissue santonin soda is absorbed into the blood. Also, if introduced into the stomach, santonin as well as santonin-soda may pass into the blood.

4. Under conditions not completely known, santonin as well as santonin-soda are changed, within the animal body, wholly or partly into a substance which is secreted with the urine, and can be demonstrated in the latter by means of caustic alkalies.

5. The change of santonin, respectively santonin-soda, into this substance which reacts, on the addition of caustic alkalies, with a red color, may take place under certain circumstances, in a very short time. The elimination of the substance with the urine, lasts, under certain conditions, a very long time.

6. Under the influence of santonin and santonin-soda the urine assumes readily a peculiar, yellow color. This color is evidently owing to the substance which is formed, in the animal body, out of the santonin.

7. On evaporating urine containing this substance, in a water bath, the latter is changed so much that it does not react any more with a red color on the addition of caustic potassa.

8. The urine secreted under the influence of santonin is not always of a saffron tint, but may occasionally assume a red color, viz.: if ammonia is formed by decomposition of area, or if the santonin has been administered in combination with alkalies.

9. Santonin and santonin-soda exert a remarkable influence on the brain and the organs of vision; they produce incoherency of ideas and chromatopsy.

10. The chromatopsy caused by santonin or santonin-soda is undoubtedly connected with the formation of the substance, reacting with a red color on addition of caustic potassa; we, therefore, call this condition "xanthopsy." The more the blood contains of this substance, the greater is the chromatopsy.

11. Chromatopsy can not be caused by dropping an aqueous solution of santonin-soda directly into the eye.
12. The phenomena produced by santonin poisoning are different according to the difference of circumstances and conditions. Death is almost always preceded by convulsions.—*Deutsche Klinik*.

2.—Messrs. V. Hasselt and Reinderhoff publish, in the *Nederl. Tijdsch voor Geneesk.*, 1860, "a contribution to the toxicodynamic knowledge of santonin." They draw from their experiments the following conclusions, important to the practitioner as well as to the toxicologist:

1. Santonin can act as a poison.

2. As it seems to belong, in general, to the class of *narcotica spinalia*, without leaving in the dead body any perceptible sign of its irritating secondary effect, although symptoms of it are observed in man during life.

3. Its action, on the administration of large doses, is analogous to that of tetanic poisons.

4. In relatively smaller doses, for instance of six grammes, it produces, in dogs, slight symptoms of poisoning.

5. In large doses of sixty to ninety grammes, it can act fatally on these animals with relative activity.

6. Santonin manifests its action then, at first, in the sphere of the motory nerves, which action is shown by spasmodic contractions of the muscles without an increase of sensibility. The course of the affection makes it evident that the motory part of the spinal narrow is acted upon progressively from below upward. The fatal termination seems to be owing to spasms of the respiratory muscles and of the muscles of the larynx. These spasms may be considered the cause of the asphyxia which finally takes place.

7. The post-mortem appearance, hyperæmia of the lungs, engagement of the heart, hyperæmia of the cerebro-spinal membranes, and capillary injection of the medulla spinalis and oblongata, are probably in causal relation to the spasmodic contractions of the muscles as well as to the death by asphyxia.

Without having the intention of assuming, from their experiments, that the effects upon man are equal to those upon dogs, the authors still believe that, considering their observations in regard to the action of santonin upon man, they have sufficient reasons to conclude that santonin is, by no means, to be regarded as an innocent remedy.—*Medizinische Neuigkeiten*.
Digitals in the treatment of Mania a Potu. By G. C. Cat-lett, M. D.

The experience of the physicians of this city, so far as my knowledge extends in the treatment of Mania a Potu, has been very unsatisfactory. Most of the attacks assuming a remarkably acute form; with great violence of delirium, furious mania, and persistent mental aberrations, have generally resisted the opium and stimulating as well as all of the former established methods of treatment for this unfortunate class of sufferers.

So great has been the mortality from this disease during the last four or five years, notwithstanding we have attempted to discriminate between the chronic and the acute forms, that we have become apprehensive that we have not been treating alcoholic poison. Indeed so general has become the impression that the various alcoholic drinks generally used, contain a foreign poison, that those who are in the habit of becoming intoxicated are significantly said to have taken passage on the strychnine line for an unknown destination. While the symptoms of the numerous cases that have come under my observation do not, in the slightest, resemble those from the poison of strychnia, yet, the great apparent difference in the character of the symptoms as well as in the result of the disease—produced by excessive use of alcohol—at the present and former periods, that it would very naturally create apprehension and strike terror the spiritually infatuated.

There have been a few persons, by a prolonged debauch have induced inflammation of the mucous membrane of the stomach or at least, such a degree of irritability that a continuation of indulgence was impossible, as nothing introduced into it would be retained, soon, therefore, from the withdrawal of the stimulons, delirium tremens would supervene, characterized by intense hallucinations, great tremulousness, incapacity to sleep, irritability of stomach, tender epigastrium, and deficiency of the secretions. Counter irritation to the epigastrium, a mercurial cathartic, stimulants judiciously administered (I prefer Tinct. Serpentaria; and Tinct. Valerian, equal proportions,) and Morphia pro re nata, will generally in my hands relieve such cases. But that form of this disease that is produced by the constant daily use of alcohol long continued, poisoning the blood and resulting in acute mania, is the fatal form, or properly Mania a Portu. In relation to this form of the disease Prof. Stone of New Orleans says:

"Brain fever and apoplexy are terms often kindly substitut
Mania a Potu. [January,

ed as being more respectable; but names do not alter facts. Mania a Potu usually occurs with the robust who habitually use alcoholic stimulants, but not to any great excess, except upon occasions, and when they are carried to a certain extent, a necessity for their continuance is created, and their excessive use cannot, or will not, be resisted until the stomach gives way and finally reject them. During this process the mucous membrane becomes engorged, the digestion, and finally the appetite, entirely fail, and the patients is sustained for some days after, by stimulants alone, until furious delirium sets in.

"This madness is not due to the stoppage of an accustomed stimulant, for it often sets in while the subject is in the full use of it, but it is plainly due to alcoholic poison and the absence of proper nutritive matter in the blood. I think I may add another cause which has often something to do in causing the delirium, and certainly much to do in causing death, under some modes of treatment, and that is suppressed excretions. So long as the stomach is intact, and the appetite and digestion good, an immense quantity of stimulant may be disposed of without serious immediate consequences; but when the organs finally from constant excitation, became engorged, nutrition ceases, and the alcohol is retained more in the blood, instead of being carried off by excretions, and a wild delirium soon follows.

"It is plain, under these circumstances, that the indications are to establish the excretions, disgust the system of the alcoholic poison, and to introduce proper nutriment. The first two are accomplished by one and the same means. The stomach is generally irritable; at least there is frequent vomiting; but it is owing to the accumulation in the stomach of morbid secretion, rather than from inflammation of even irritation; for calomel in small doses, frequently repeated, arrests it with great certainty. If the subject is governable, and will take medicine willingly, calomel should be given in two or three grain doses every hour, or oftener if the case is urgent, until fifteen or twenty grains are given: if medicine has to be given; by force, it is best to give a full dose at once: and this is the better, for in the worst cases the stomach is not nauseated, and the sedative effect, of a large dose of calomel calms the nervous excitement, and at the same time produces the appropriate effect upon the excretory organs and mucous coat of the stomach and bowels. It requires some hours for this effect to be produced, and it is improper to give anything to promote its action upon the bowels under ten or twelve hours,
and I think even a longer time would be better, if the case is not urgent. Small and frequently repeated doses of saline medicine are the best after calomel (sulphate of magnesia is best), which promotes the excretions, disgorges the stomach and bowels, and clears the system of its alcoholic poison, to its great relief. An active cathartic may afford some relief, but the system is not so well disgorged by it; more or less serum from the blood is carried off, causing weakness; while, in the other process, by giving time for the action of the calomel, and then promoting it by gentle but continued means, the organs exercise a selection in excreting, and thereby a large amount of effete matter is discharged, and the patient feels the stronger for it, being freed from an incubus that was weighing it down and producing apparent exhaustion. After this process, we should lose no time in introducing nutriment, and for this pur- ducing apparent exhaustion. After this process, we should lose no time in introducing nutriment, and for this purpose milk is almost universally applicable; and as the mucous membrane of the stomach seems to be denuded of its epithelium, the addition of lime water renders it particularly grateful and soothing. Patients in this condition generally loathe animal substance, but milk is almost always grateful to the taste and is particularly appropriate, for it furnishes the most innocent solid for the bowels, that have been long deprived of their wholesome stimulus. If it should happen that a patient could not take milk, well boiled corn-meal gruel is the next best diet most likely to be relished; and for something more substantial, strong, well-seasoned broth, frozen, will be the most likely to agree.

In all acute cases, alcoholic stimulants should be withheld, for they act like poison and will often bring back delirium. Should stimulents be thought necessary (and it is not often really necessary) the carbonate of amonia, or the aromatic spirits of amonia are preferable; or it may be proper, in some case, to allow malt liquor. Opium in all forms should be prohibited, until the system is relieved of its alcohol and even then I find it can generally be omitted; and when it can be, the patient recovers sooner and better. The patient is not expected to sleep well, but if the blood is renewed by its appropriate nutriment, natural sleep will follow.

Occasionally, when, previous to the debauch which immedi-ately caused the mania, a free use of stimulants had been indulged in some time, we have an exalted state of the nervous system, attended with hallucinations and sleeplessness, which require special attention. Potent stimulants operate badly,
and opium alone does not operate well, though in large doses sleep may be forced, though not without some risk, in some cases, to the brain; but equal parts of morphia and tart. antimony, given in small and repeated doses, will soon calm the nervous system and induce sleep without injury either to the brain or stomach. There is nothing that cools off the heated imagination in these cases like nauseating doses of tart. antimony, and opium in some form may be added, if it is thought necessary. The too general opinion that sleep is the all-important thing in the disease has led to fatal errors in treatment. Opium, given freely, as it often and very generally is, while the blood is charged with alcohol, produces a very unfavorable effect upon the nervous system, and tends to check the excretions, which are already diminished, and the patient, without being narcotized, often goes into a stupid state resembling the effects of uremic poison; and if about one-half (about the usual proportion), by the vigor of their constitution, weather it, in spite of all the poisons imposed upon them they recover slowly, and their organs are left in bad condition.”

We make this lengthy extract from Prof. Stone’s communication on this subject, because he makes the important distinction between delirium tremens and Mania a Potu, and in his usual clear manner points out the rational treatment in the two forms of the affection, those views, we think, should be more thoroughly impressed upon the profession, notwithstanding we are satisfied that the difference in the two forms of alcoholic poison is clear, the treatment of Dr. Stone is the rational treatment, yet the Mania a Potu that has occurred in this city for the last few years, has been remarkably fatal, and all methods of treatment very unsatisfactory.

Therefore I determined to try the Tinct. Digitalis in large doses, recently two cases presented an opportunity. The first a man, the second a woman. A description and treatment of one case will describe both in all essential particulars. Mr.——— after a debauch of several weeks, and while yet stimulated to as great a degree as all the varieties of alcoholic drinks could produce: in attempting to light a segar, fell upon the floor in the most frightful convulsions, raving and foaming at the mouth, and mutilating his lips, tongue, hands and arms with his teeth. In a half an hour after this convulsion he was furiously delirious, recognizing no one, muttering his imaginary fears, and now and then making fearful struggles to escape from his bed, his face almost livid, eyes deeply injected and eyes greatly swollen, pulse one hundred and sixty, weak and thread-like.
In the interval of the convulsions, and before my arrival, one-half a grain of morphia had been administered to him. I immediately administered five grains of Ipecac and two grains Tarter Emetic, and repeated it every fifteen or twenty minutes until he had ejected everything from his stomach. This occupied several hours when his symptoms were not in the slightest improved. I then determined to watch the action of the digitalis and commenced by administering a large spoonful every half hour. The first dose improved his pulse, it diminished in frequency and increased in volume. The second dose lessened his ravings and made a more palpable improvement in his pulse. The third dose was increased one-half, when all of his symptoms in one hour, were manifestly improving. I then increased the dose and lengthened the time of administration, in about seven hours from the taking of the first dose his pulse was full, slow and regular, his delirium had entirely vanished, and he was sleeping though interruptedly, now and then disturbed by his hallucinations. I then continued the Tinct. Digitalis in smaller doses, giving a mercurial cathartic. His sleep became sound and tranquil, he awoke in about six hours, sane in mind and almost well in body. The only remaining vestage of disease, was extreme nervousness. I then prescribed Tinct. Valerian and compound tincture of cinchona in equal quantities. The second case was almost as severe as the first and was treated in like manner and resulted as favorably. If Digitalis acts by sedation, will not Veratrum be a more efficient remedy in Mania a Potu?

Solutio Atropica Glycerinea; a Preparation for the Dilatation of the Pupil in Cataract, Iritis, &c. By Charles R. C. Tichborne.

Since atropia was first brought into notoriety for the above application, by Reisinger, it has completely superceded belladonna where introduction into the eye is necessary, but the extract is still resorted to for painting the eyebrow and cheek in such operations as absorption of cataract or anything similar, where it is indispensable in order to prevent adhesion of the iris to render the dilatation permanent; no preparation of the alkaloid yet introduced being applicable to the exigencies of such cases. A few of the objections to the use of the extract may be enumerated as follows: Liability to produce cutaneous irritation; secondly, its requiring great attention in keeping the surface moist with some some lotion to prevent
its drying; and thirdly, want of cleanliness, as the extraneous manner of this inspissated juice are certainly very much out of place when manipulating with so delicate an organ as the eye; in some cases complete failure results either from the use of a bad preparation or non-absorption from harshness of the epidermis.

Some time ago glycerine was found to possess great solvent properties, particularly as regards the alkaloids and some of the non-nitrogenous organic principles. The author has determined its action and solvent power in connection with atropia with a view to its use as an elegant and efficient mode of exhibiting this substance where permanent dilatation of the pupil is requisite. A saturated solution in glycerine gave, on analysis, four per cent. (=gr. xviij. ad. 5 i.) of the vegeto-alkali. It does not dissolve readily in the acid, but is soluble to almost any extent on applying a gentle heat; the excess, if it is not great, deposits on cooling in fine transparent colorless prisms, but if the amount is considerable it becomes, when cool, a solid mass. From this it is evident its solubility in glycerine is much greater than in water, it requires 189 parts of the latter menstruum to dissolve it in the cold;* indeed the atropia is recoverable to a considerable extent by precipita-
tion on the addition of water to the glycerolic solution. The easiest method of making this solution is as follows:—One decigramme (=1,553 grains.) dissolve in a few drops of al-
cohol is added to 20 grammes (=368.680 grains) of distilled glycerine; the mixture is then subjected to a gentle heat, viz: 110° Fah. for half an hour in an evaporating capsule to vola-
tilize the spirit. This will contain one-half per cent., i. e., 2.187 grains to the ounce, and may be labelled "Fortior." On smearing the surrounding parts of his eye the writer found (without dropping in any solution) the dilatation of the pupil perceptible in 15 minutes, from which it steadily increased. A weaker solution, i. e., one containing one-fourth per cent. made by using one decigramme to 40 grammes, may be used

*The author was induced to enter into the examination of the solubility in water from observing the non-conformity of works of reference on this subject. His experiments gave as a mean result 1 part atropia, to be soluble in 189, generally given as soluble in 300 parts, whilst Lowig gives it as requiring 2000; the writer thinks this must be a typographical error and must be intended for 200 parts. This diversity might be accounted for in some degree, as an amorphous modification, produced by action of a gentle heat, as apparently much more soluble. This uncrystallizable variety is equally efficient with the other in dilating the pupil.
to determine the dilation, by an occasional application, and also to allow for absorption. A solution in glycerine of atropia may be made containing 16 grains to the ounce, without any danger of its crystallizing out.

The advantages to be derived from the use of this preparation are: first, the emollient properties of the glycerine, which, by softening and relaxing the shafted skin, freely allows the absorption of the active principle; secondly, the certainty of always keeping the alkaloid in the soluble form, and thus ensuring equal distribution from the hygrostatic properties of the glycerine, which could not be obtained from the use of any sequeous solution, even in the form of a malate, as in the extract, and also its ease of application, freedom from attention as it always remains moist; and lastly, the certainty appertaining to the employment of all medicaments of a definite composition.—Chem. News.

[Many of the following extracts are from the valuable monthly summary prepared by Dr. O. C. Gibbs, for the American Medical Monthly.—Eds. S. M. & S. Journ.]

**Scarlet Fever.**—In the Chicago Medical Examiner, for November, there is a published report upon practical medicine, furnished by Dr. C. Goodbrake, for the Illinois State Medical Society. Under separate heads we shall allude to a few of the more novel opinions and practices. First, then, of scarlet fever: Dr. J. N. Niglas' treatment of this disease is expectant, and contains nothing noteworthy, except the local treatment. He says: "The region of the parotid and submaxillary glands, from the beginning, I advise to be covered with cotton, and flannel wrapped around the neck: and as soon as the slightest swelling commences to be perceptible, a liniment composed of ol. amygdal. dulce. 5ij., liq. ammon. 5ij., ext. connii. 5j., gum camphor gr. x, is repeatedly applied during the day, the cotton and flannel wrapped around; and glad am I to say that (during the severe epidemic just passed) none of the cases under my charge were lost by consecutive suppuration."

Dr. Prince would control the pulse with the veratrum viride and then use the stimulating treatment immediately and freely if need be.

Dr. Hiram Nance aw one very severe case recover under full doses of carbonæ e of ammonia, that he thi... must have died under any other medication. It (ammonia) was first recommended by a French physician, and Dr. Nance's experience is in its favor.
There are few diseases more nearly allied in nature, or in therapeutic requirements, than erysipelas, and scarlet fever. They are produced by a specific poison, affecting the system peculiarly and specifically. We have not space to enlarge— suffice it to say that mutriatic tincture of iron, quinine, and they will be found of the most service in erysipelas and diphtheria, and they will be found of corresponding benefit in scarlet fever.

For ourselves, we have no doubt that full doses of quinine is one of the most important remedial agents that can be brought to bear upon scarlet fever. Though foreign from our plan, we trust we may be excused for quoting from a transatlantic journal in support of these views. In the London *Lancet*, for October. (American reprint,) Dr. J. Hawkes, speaking of malignant scarlatina, says: "For those who may have such cases to meet—and no doubt they occur too often—I can forcibly recommend the use of quinine. My attention was first called to it in this disease, by the excellent little work of Mr. Peter Hood, in which he so strongly urges its adoption in all forms of scarlet fever. I have put his plan to an excellent test in a large dispensary practice, and have every reason to bear testimony to its success."

As an additional evidence in support of the tonic and stimulating treatment in scarlet fever, we again quote from the same number of the *Lancet*. Dr. T. J. Graham, speaking also of malignant scarlet fever, says: "There is abundant evidence before the profession in proof that the sesquicarbonate of ammonia possesses specific powers over the worst forms of scarlatina, and that, when the eruption recedes, no means known have the same power in reproducing it, and relieving the patient."

"I am fully convinced that this preparation of ammonia, administered regularly, day and night, and trusted to alone, with a mild aperient and a suitable diet, will be found fully equal to the restoration of the patient. The great and superior value of this excellent medicine in scarlatina and rubeola is, I fear, but half apprehended."

**Diphtheria.**—Upon this subject, but little that is new or interesting is elicited. Dr. Prince says that the local application of the nitrate of silver has not met his expectations: "A weak infusion of capsicum and a saturated solution of chlorate of potash, singly or in combination, have proved more satisfactory." Dr. Goodbrake says, "As a local application to the lachrymal and tonsils, we found the mur. tr. iron to answer the best purpose in all cases that came under our treatment. We
tried the nitrate of silver, sulph., of copper, alum and sulph. of copper combined; but the tinct. of iron seemed to have the best effect in our hands.

The best remedies internally seemed to be quinine, tinct. of iron, chlorate of potassa, and good porter or brandy, with good nutritive diet." No allusion is made to a saturated solution of common salt, as a wash or gargle to the throat; this, of all means, has pleased us the best. We have applied this remedy to the throat for another trouble, which we may as well mention here as elsewhere. A lady of our acquaintance had, for man years, been subject to frequent attacks of quinsy, which always passed on to suppuration. In the last year, we have aborted two severe attacks by the local application of muriated tincture of iron, applied several times a day. We have reduced the remedy with about two parts of water to one of tincture.

**Diarrhoea of Children.**—In regard to this disease, we shall quote that one remark from the report. Dr. J. O. Harris remarks upon the treatment as follows:

"I found that after exhausting all the usual remedies advised by our standard authors, and by my brother physicians, that quinine in full doses, frequently repeated, (acted or seemed to act) admirably. I thought at the time that I was prescribing empirically, and now I do not pretend to explain the *modus operandi* of the remedy. I only know this, that my patients recovered under the use of quinine, and I still frequently prescribe, it, when I see no particular indications for its use."

**Typhoid Fever.**—The following is Dr. Nance's treatment of this form of fever:

"My treatment, stated in brief, consisted of spts. nitri. dule., 5viij., Norwood's tinct. veratrum viride, gtt. xi. Mix: give one teaspoonful to an adult every three hours, so long as the active stage remains, increasing or diminishing the dose as the case requires. It may be necessary to continue this medicine for eight or ten days, or more. I also prescribe at the same time turpentine emulsion, usually combined with tinct. opis.; the first prescription subdues the activity of the pulse and acts favorably upon the urinary and perspiratory systems; the latter, containing laudanum, quiets the nerves, promotes sleep; and the spts. turpentine has its specific action upon the glands of the mucous membrane of the bowels." When convalescence is established, or if the patient begins to sink, he resorts to support. "My prescription during the fall, under such
circumstances, consisted of sul. conchonia, grs. iij.; caumfor, grs. iv., carb. amm., gt. iij. Mix, and give every four hours and alterate with wine from two to three teaspoonfuls."

We apprehend the secret of success in the treatment of typhoid fever consists in "preventing" rather than "treating" bad symptoms. Many physicians give turpentine only when the tongue is dry and the bowels tympanite will heal the ulcerated state of the bowels, which is sometimes present in the late stage of bad cases, it is not unreasonable to suppose that, in the incipient stage of this condition, it may act curatively and prevent the diarrhoea, tympanitis, the red and dry tongue, &c. Many only support the system when death seems imminent. Tonics, such as quinine modified by opium and wine, can be resorted to much earlier than they often are in this disease. When prostration is very decided, we think Dr. Nance's two or three teaspoonfuls of wine will not bring out the full influence of a supporting treatment.

We have given a tolerably full synopsis of this report, because it is a good exponent of modern treatment, among Western physicians of some of our more common diseases.

Hemoptysis Treated with Muriated Tincture of Iron, &c. In the Chicago Medical Examiner, for November, Prof. N. S. Davis reports an alarming case of hemoptysis, occurring in a lady 24 years old, who had a decided hemorrhagic diathesis; inasmuch as the father of the patient and one sister had previously died from hemoptysis. Common salt, gallic acid, acetate of lead, opium, alum, tinct. matico, gelseminum, oil turpentine and quine were thoroughly tried, with partial and temporary benefit. "At this stage of the case," he says, "we advised the tinct. ferri muriatis, and tinct. of ergot, equal parts of which forty drops were taken every two hours. Under the use of this mixture the hemorrhage ceased in less than 24 hours, and has not been renewed since."

Diphtheria.—In the Louisville Medical News, for October, Dr. S. P. Bryan reports his experience with diphtheria. Within the last year he has treated fifty-five cases. In these cases all but sixteen showed the peculia; diphtheritic exudation. We should be glad to give Dr. Bryan's remarks upon the treatment in full, for we regard it as quite judicious; and, besides, it was successful in all of the cases but one; but want of space will prevent. We simply copy his recapitulation:

2. "Diphtheria is not a self-limited disease, in the light in which we so regard measles, variola and typhoid fever, but that its duration may be materially abridged, as well as its
violence greatly mitigated, by prompt and proper treatment.

2. "The milder cases of diptheria require no other treatment than the local application of nitrate of silver, in solution and the internal use of chlorate of potash, together with generous diet and the cautious use of such mild aperient medicines as well maintain a soluble condition of the bowels; while the more severe cases may generally be very promptly controlled, if the treatment is early commenced, by the addition of quinine, and occasionally of brandy and iron, to the foregoing.

3. "Depletion in this disease, whether direct by blood-letting, or indirect by purgation, &c., is not only a valueless expedient, but, in consequence of its debilitating effects, is positively injurious, by favoring the accession of typhoid symptoms, and preventing a rapid and satisfactory convalescence."

The nitrate of silver is applied—20 grains to the ounce—by thoroughly mopping the throat three or four times a day. This followed, half an hour later, with a solution of chlorate of potash—\( \frac{3}{4} \)ij. to iv. to water Oj—used as a gargle. In severe cases, his main dependence is placed upon quinine, which, to adults, he gives in from 20 to 30 grains a day. "This," he says, "appeared to control the fever, and to arrest the progress of the disease in all instances, except the single fatal case before referred to, in from two to five days." He says further: "It appeared to me that the quinine exerted a curative influence not inferior to that which it exerts in ordinary malarious fevers; the pulse, which before was small, feeble and rapid, numbering in some instances from 120 to 140 beats per minute, speedily becomes, under its benign influence, fuller, stronger and slower, just as we often see in congestive fever.

**Dysmenorrhea.**—In the St. Joseph Med. and Surg. Journal for November, Dr. J. B. Snelson has an article upon dysmenorrhea, in which he recommends quinine in combination with prussiate of iron, particularly in the rheumatic or neuralgic varieties. He would treat the menstrual period with opium and the warm bath, and the intermenstrual period with the following:

![Revised image content]


Divide into pills No. xx. One of the pills to be taken morning, noon and night; this treatment to be continued during the whole intermenstrual period." If we rightly remem-
ber. Dr. E. Tilt, in the *London Lancet*, for 1851 or 1852, recommends quinine in combination with sulphate of iron and hyoscyamus, or opium, for most of the unnatural manifestations of the menstrual function. We are not certain that dysmenorrhoea was included. From the change which strychnine has in our hands over the rheumatic or neuralgic difficulties of a chronic character, we would suggest it in connection with quinine, in dysmenorrhoea.

**Post-Partum Uterine Haemorrhage.**—In the *Lancet and Observer*, for November, Prof. George Mendenhall reports a severe case of post-partum uterine haemorrhage. The usual means were resorted to without benefit; the hand was inserted into the uterus, also lumps of ice, but still with no check upon the haemorrhage. Ergot was given, but with no perceptible effect. At this stage a catheter was introduced to the uterine fundus, “and about three ounces of the saturated solution of the persulphate of iron injected through it into that organ.” Its retention was secured for a few minutes by the hand in the neck of the uterus. The injection produced no pain, but “from that moment not another drop of fresh blood was discharged from the uterus and vagina.” The patient “recovered without an unpleasant symptom.”

**The "Throat Distemper" of the Last Century.**—In the Boston *Medical and Surgical Journal*, for November 15th, Dr. Q. H. Gay republishes a paper upon the above subject, written by Jonathan Dickinson, of Elizabethtown, N. J., in the year 1738, and published in Boston in 1740. Dr. Gay intimates that the disease described, and for which directions were given for treatment, was none other than diphtheria. Dr. Dickinson describes no less than six varieties of the disease, and some of the symptoms do conform very accurately to those of the last named disease. When he says, “The whole throat, and sometimes the roof of the mouth and nostrils, are covered with a cankerous crust, which corrodes the contiguous parts, and frequently terminates in a mortal gangrene, if not by seasonable applications prevented,” we recognize a disease resembling diphtheria. Also, when he speaks of the disease as an epidemic, often causing great fatality, with symptoms of hoarseness, difficult breathing, loss of voice, occasional bubo-like ulcerations, and the expectoration of large quantities of tough, whitish sough (membrane) from the lungs, we also recognize conditions sometimes present in diphtheria. Again, in uniformity with the above, speaking of symptoms, he says:
"The tonsils first, and in a little time the whole throat, is covered with a whitish crustula; the tongue is furred and the breath fetid." But other symptoms are mentioned that show a dissimilarity to diphtheria, as it now manifests itself; thus, he says, "Upon the 2nd, 3d or 4th day, if proper methods are used, the patient is covered with a milianary eruption, in some cases exactly resembling the measles; in others more like the scarlet fever, (for which distemper it has frequently been mistaken,) but in others it very much resembles the confluent small pox."

It may be interesting to notice, in this connection, a remark or two in regard to treatment. As a local means to the throat, he says, "I have found the following method most successful: Take Roman vitriol, (cupri sulphas,) let it lie as near the fire as a man can bear his hand, till it be thoroughly calcined and turned white: put about 8 grains of this into half a pint of water: lay down the tongue with a spatula, and gently wash off as much of the crust as will easily separate, with a fine rag fastened to the end of a probe or stick, and wet in this liquor, made warm. This operation should be repeated every three or four hours."

In conclusion, and in a postscript, Dr. Dickinson gives the treatment of a brother practitioner, which is reported to be remarkably successful: it is advised in all forms of the disease. This treatment consists of the administration of a "decoction of the root of the dact weed or squaw-root," prepared in the following manner: "He orders about an ounce of this root to be boiled in a quart of water, to which he adds, when strained, a gill of rum and two ounces of loaf sugar, and boils again to the consumption of one-quarter part. This he gives his patients frequently to drink, and with this, orders them frequently to gargle their throats; allowing no internal medicine but this only, (during the whole course of the disease) excepting a purge or two in the conclusion."

Opium.—In the Medical and Surgical Reporter, for October 29th, 27th, and November 3d, the paper of Dr. G. Hamilton upon the use of opium is reported, and the discussion which it elicited. We have space only to refer to a very few points in the argument. It is the one of Dr. Hamilton, that the cerebrum is the part most affected by opium. It is generally conceded that the secretions are diminished under the use of opium; yet there is one exception to this, which we consider of vast practical importance, and we will state it in
the language of Dr. Hamilton. "Perspiration is nearly always increased by a moderate or full dose of opium, and this increased activity of the cutaneous exhalents is generally accompanied by an increased action of the heart and arteries, as is shown in such cases by increased color of the surface of the body." Dr. Hamilton considers the various diseases in which opium is appropriate. We have not space for an abstract. We will only instance peritonitis, dysentery, typhoid fever, and various forms of inflammation. In the discussion upon this paper various distinguished physicians took part. We will here refer to only one idea: Prof. Condie, remarking upon this subject in reference to congestion and inflammation, says, that in congestion of the lungs the administration of opium has always a tendency to increase it. We very much doubt the correctness of this assertion: we believe that opium has a tendency to relieve all internal congestions. We know of no remedy that will so increase the cutaneous circulation, and produce free perspiration, as will opium. In congestion of the lungs, a harassing and perpetual cough but increases the congestion. Opium, by allaying this cough, determining the circulation to the superficial blood-vessels, and the free perspiration consequent upon this, can have no other influence than to relieve the internal congestion. Here we leave the subject, referring our readers to the paper of Dr. Hamilton, and the discussion following, as worthy of attentive consideration.

Varicose Veins of the Leg.—In a former number, we referred to the treatment by subcutaneous ligation, as practiced by Dr. R. J. Levis, of Philadelphia. In the Medical and Surgical Reporter, for November 17th, Dr. Levis has an article upon this subject. He regards varix of the leg as, practically, a disease of the saphena vein: the proper treatment he believes to consist in the obliteration of this vein. The manner of its accomplishment is described in the paper referred to. He thinks the operation is best performed while the patient is standing. To have the limb at a convenient height, he would have him stand upon a chair or table, and so placed that the patient can steady himself against the wall. He prefers a round, straight needle, to the curved needle, or to one with the common surgical needle point. The vein is found, and the needle is inserted perpendicularly, until it reaches the under service of the vein. The shaft is then depressed, the point passed
under the vein, and passed out on the opposite side. The needle is now made to enter at the orifice of exit, and passing now above the vein, emerges at the point of original entrance. It should have been observed that the needle should previously be armed with a silver or iron wire of small size. The wire is now drawn down upon the vein, tightened, and fastened by twisting. Adhesive or isinglass plaster is now applied over the wounds, and the limb is bandaged from the toes to the knee. Dr. Levis regards this treatment as eminently successful, and accompanied with no danger.

Chronic Bronchitis—A New Remedy in.—In the Medical and Surgical Reporter, for November 17th, Dr. H. Wilson has an article upon the treatment of chronic bronchitis. He regards local medication as of the first importance, and considers in review most of the means, the use of which has been recommended in this manner. Suggesting a new remedy, he says, "For several years past I have been in the habit of using a remedy, which may not be new, but which far surpasses that of any other which I have tried in relieving, and in many instances entirely eradicating, the affection. I refer to the leaves of the common mullein, (verbascum thapsus,) dried and smoked in a pipe. In that form of the disease in which there is dryness of the trachea, with a constant desire to clear the throat, attended with little expectoration and considerable pain in the part affected, the mullein, smoked through a pipe, acts like a charm and affords instant relief. It seems to act as an anodyne in allaying irritation, while it promotes expectoration and removes that glutinous mucus which gathers in the larynx: and at the same time, by some unknown power, completely changes the character of the disease, and, if persevered in, will produce a radical cure," He says the remedy should be used as indicated above, at least two or three times a day.

Radical Cure of Oblique Inguinal Hernia.—Dr. D. Hayes Agnew has invented new instruments for the radical cure of oblique inguinal hernia. The principle of cure does not differ materially from that put in practice by others: the instruments used may enhance the convenience of the operation. We have not space for a full description. Suffice it to say, that the scrotum is invaginated into the inguinal canal, and is held there, and the canal rendered patent, by
an instrument not unlike a bivalve speculum. A long, spear-pointed, curved needle is now armed with a wire, carried up in the groove of the blades, and made to pierce the integuments coming out through the walls of the abdomen. The other end of the wire is now threaded, and the needle is made to pierce again the parts but a short distance from the first insertion. The wire is now drawn down and fastened; the object being to make a plug of integuments filling the inguinal canal. Several stitches are now taken across the canal, in front of the cord, the object of which is to aid the first in retaining the invaginated portion of the serotum, and thus forming a permanent tegumentary plug, filling the canal, and thus preventing the descent of the bowel. We condense the above from an article in the Medical and Surgical Reporter, for November 17th.

Bearing upon this point, we might remark, that Prof. Tyme, of Edinburgh, says that all apparatus for this operation is unnecessarily complicated. "A piece of candle," he says, "with a little piece of twine through one end, will answer all purposes."

Belladonna in Sore Throat.—In the Medical and Surgical Reporter, for November 10th, Dr. J. W. Thompson has an article upon belladonna. He has used belladonna in inflammation of the breasts with good effect. He dissolves °0j. in °3j. of water, and applies to the inflamed breasts. We use the fluid extract without dilution, and it has never disappointed us, when used to prevent inflammation in cases of delivery of still-born children. Neither has it disappointed us in the cure of inflammation of the breast, where suppuration had not already commenced. We have referred to the paper of Dr. Thompson more for the purpose of giving his experience with belladonna in sore throat. He says, "My experience with it in incipient sore throat would lead me to rank it almost as a specific, if used sufficiently early. My plan is to give the sixtieth of a gr. of atropia, and I rely upon it confidently if given within six hours of the first appearance of inflammatory symptoms. I have tried it repeatedly upon myself, as well as others, and yet have to note the first failure." He thinks its beneficial influence is limited to the very early stages of the attack.

Obstructions of the Lachrymal Duct.—In the American Medical Times, for November 17th. Dr. J. E. Macdonal describes a new method of operation. He says, "I have done
away entirely with the director, and only employ a blunt-pointed, narrow, and slightly curved bistoury, the blade of which is only about three-quarters of an inch long, the heel about three-sixteenths of an inch broad, and which tapers to a fine blunted point, a very little probe-shaped. It is sharp on its concave edge, cutting to the point, which is very narrow; and to provide for its strength, the back is somewhat stout, and delicately clubbed at its extremity."

Dyspnœa from Cardiac Disease relieved by the Inhalation of Oxygen.—In the American Medical Times, for November 17th, Dr. J. C. Acheson, reports a case, in which a troublesome dyspnœa was relieved by the inhalation of oxygen. In the case reported, the pulse was imperceptible, with other symptoms corresponding. He says: "Within 15 minutes after the patient began to inhale the oxygen, signs of relief were apparent. The restlessness ceased; the breathing became much easier; pulse became perceptible at wrist; intelligence began to return; and waking from his lethargy, he complained of the coldness of his body, and desired more clothing." The patient died, but the benefit resulting from the inhalation of oxygen argued better results in more favorable cases. In extreme dyspnœa, in the last stages of consumption, we have resorted to the inhalation of small doses of chloroform, with very decided benefit.

Diphtheria.—In the Cincinnati Medical and Surgical News, for November, Prof. T. A. Reamy has an article upon this affection. He says he has treated 250 cases, and remarks: "I will here assert, that, in my humble judgment, any one who will, at the very outset of the attack, administer full doses (3 to 6 grs. to children 3 to 6 years old) of sulph. of quinine, and continue its use, in connection with chlorate of potash, and apply nit. silver in solid stick locally, avoiding mercurials in any quantity or form, catharticizing as little as possible, will find such success attending his treatment as will lead him, if he had doubts as to the nature and pathology of the disease, to settled and satisfactory conclusions. In many cases, I deem it better to use nitric acid in connection with the quinine treatment, than chlorate of potash."

Diphtheria.—In the Kansas City Medical and Surgical Review, for November, one of the editors, Dr. T. S. Case, has an article upon diphtheria. We take pleasure in giving the
treatment of those who have had experience with the disease, be that treatment what it may. In a typical case Dr. Case's treatment is the following: "During the febrile stage, if there be any indication of an overloaded condition of the stomach and bowels, I give an emetico-cathartic; after the operation of which, I direct the use of full doses of Dover's powder to quiet any nervous excitement, to prevent the too free action of the cathartic, and to encourage perspiration. In addition to this, I prescribe, to be taken until the kidneys are acted upon freely, the following mixture:

R—Spts. etoris nit., 5ij.
Olei Terebinth., 5ij.
Mucil. gum. Acacie, 5vj. M.

Dose for an adult—desertspoonful every hour or hour and a half. For a child, this mixture might be rendered more pleasant by the addition of sugar &c. After the subsidence of the fever, I immediately commence upon the tonic and stimulant treatment, consisting of beef tea, egg-nogg, &c., ad libitum; and in addition, quinine, comp. tr. cinchona, muriatic acid diluted and sweetened, chloric ether, carbonate of ammonia, chlorate of potash, &c. These various remedies are to be applied, in quantity and time, as indicated by the condition of the pulse and nervous system." Any person who will take the trouble to examine our "Summary" for the last year, will find the therapeutic experience of the most influential in the profession, whether at home or abroad.

Lectures on the Theory and Therapeutics of Convulsive Diseases, especially of Epilepsy. By Charles Bland Radcliffe, M. D., Fellow of the College, Physician to the Westminster Hospital, etc.

LECTURE I.

Mr. President and Gentleman—Of the three Lectures which I have the honor of delivering before you, I propose to devote that of to-day to the Physiology of Muscular Motion; and this I do because it seems to be necessary to reconsider the whole of this subject, and to change our opinions in some very important particulars, before we can hope to have sound views respecting the theory and therapeutics of convulsive diseases.

The recognised opinion respecting muscular action, I
need scarcely say, is, that muscle is endowed with a vital property of contractility, and that the state of contraction is brought about when this property is called into action. When the muscle contracts, that is to say, this vital property of contractility is supposed to be roused or excited, or stimulated into action, and the more the muscle contracts the more is this property supposed to be thus acted upon. But this is not the only opinion which may be held respecting muscular action. On the contrary, it may be held that the true type of muscular contraction is to be found in rigor mortis. It may be held, indeed, that muscle contracts, not because a vital property of contractility has been roused into action by a stimulus, but because some antagonizing influence has been withdrawn, which previously prevented the free action of common muscular attraction in the muscular tissue.

When, upwards of ten years ago,* I endeavored, for the first time, to show that the latter view of muscular action was the correct one, I believed that I stood alone in this opinion. In point of fact, however, others had gone before me, whose thoughts were, more or less, akin to mine. Writing in 1832,† Dr. West of Alford, in Lincolnshire, says: "Nervous influence is imparted to muscular fibre for the action of the will, and of all other deposers to contraction, is simply to withdraw for a while this influence, so as to allow the peculiar property of muscular fibre (contractility) to show itself." And in support of this opinion he appeals, amongst other arguments, to the fact of rigor mortis being deferred until all traces of nervous action have disappeared, and to the fact, not less certain, of spasmodic action taking place when we have evidence of co-existent nervous debility. It would appear as if this idea had been suggested by a remark of Sir Charles Bell, for Dr. West refers to a lecture at the Royal College of Surgeons of England, in which, after saying that the question of the modus operandi of motor nervous influence could never be settled, Sir Charles adds, that he had been led to suppose that muscular relaxation might be the act, and not contraction, and that physiologists,

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in studying the subject, had too much neglected the considera-
tion of the mode by which relaxation is effected.

In 1838—six years later—Dr. West is followed by a physiologist of no mean name—Professor Duges, of Mont-
pellier—who maintains that all organic tissues are the seat
of two opposite movements—expansion and contraction;
and that contraction, which is in no sense peculiar to muscle
is nothing more than the cessation of expansion—"in con-
tration musculaire ne consiste que dans l'annihilation de
'expansion." The muscle contracts, he thinks, in virtue of
its elasticity, just as a piece of caoutchouc might contract,
if set free from a previous state of extension; and an analogy
is hinted at between the expanded state of the muscle
and the fluid state of the fibrine of the blood, and between
rigor mortis and the coagulated state of the fibrine. Analog-
ous in its effects to electricity, the vital agent is supposed
to accumulate in the muscles and produce expansion by
causing the muscular molecules to repel each other; and
contraction is supposed to be brought about either by the
sudden discharge (as in ordinary contraction) or by the
gradual dying out (as in rigor mortis) of this vital agent. It
is supposed further, that the rhythmical movements of
muscle are caused by successive discharges of the vital
agent, which discharges are brought about whenever this
agent acquires a certain degree of tension; and that the
cramps of cholera, or the spasms of tetanus or hysteria, are
produced by the development of the vital agent being for
the time suspended. After Professor Duges\footnote{Traite de Physiologie Comparee de l'Homme et des Animaux. 8vo.
Montpellier et Paris. 1838.} comes the present distinguished occupier of the Chair of physics in
the University of Pisa. Writing, in 1847, about nervous
influence, Professor Matteucci says: "Ce fluide, developpe
principalement dans les muscles, s'y repand. et, doue d'une
force repulsive entre ses parties, comme la fluide electrique,
it tient les elements de la fibre musculaire, dans un etat de
repulsion analogue a celui presente par les corps electris.
Quand ce fluide nerveux cesse d'etre libre dans le muscle,
est les elements de la fibre musculaire s'attirent entre eux,
come on le voit arriver dans la roideur cadaverique . . . .
Suivant la quantite de ce fluide quie cesse d'etre libre dans

\footnote{Comptes Rendus, March 17th, 1847.}
le muscle, la contraction est plus ou moins forte." This hypothesis appears to have been framed partly in consequence of certain considerations which seemed to show that the phenomenon of "induced contraction" was owing to the discharge of electricity in the muscle in which the "inducing contraction" was manifested—an idea originating with M. Becquerel—and partly in consequence of the analogy which is found to exist between the law of contraction in muscle and the law of the discharge in electrical fishes; but it is right to say that Professor Matteucci does not appear to have attached much weight to his opinions upon the subject."

Next in order,† and preceding myself by not more than a month or two, is Professor Enfliel, then of Zurich, now the occupier of an important chair in the University of Vienna. The action of nervous influence, according to this physiologist, is to antagonize muscular contraction, and this opinion he founds upon the fact that rigor mortis supervenes when all signs of nervous action are at an end, that the muscles of frogs are more irritable when removed from the influence of the nervous centres, and that cramps and other forms of excessive muscular contraction are often seen to happen spontaneously in paralysed parts. And later still,‡—later than the date of my first publication on the subject—a similar view respecting the action of nervous influence upon muscle has been suggested to Professor Stannius, of

Since the delivery of this lecture I have received several pamphlets, by Dr. Louis Mackall, of Georgetown Heights, Columbia, U. S. of America, in which it is maintained that nervous influence determines a state of active elongation in muscle, and that contraction proceeds from the withdrawal of this influence. The protrusion of the tentacles of the snail and byzoon, of the tongue of the chameleon, of the head and limbs of the tortoise, the movements of muscular vessels and tubes, even muscular movements generally, Dr. Mackall thinks, are unintelligible without the aid of this hypothesis of active elongation. And that contraction is the opposite condition it is left for the reader to infer. It is no physical hypothesis, however, at which the author aims; for it is distinctly stated that "contraction as well as elongation are vital states of a muscle, to which there is nothing analogous either in physics or chemistry." Dr. Mackall's first publication was in 1848.

Rostock, by some curious experiments, in which he has seen rigor mortis relaxing, and the lost irritability returning to, the muscle under the injection of blood into the vessels.

I do not stand alone, then, in thinking that a great change is necessary in the theory of muscular action—a change amounting to no less than a complete revolution; and I am glad that it is so, for, thus supported, I am more bold to challenge attention to the arguments upon which I base my opinion.

It is only within a comparatively recent period that it has been possible to demonstrate the necessity of a fundamental change in the theory of muscular action. When I wrote first on the subject, I did not command the facts which are essential to such a demonstration, and I do not think that the writers whose names I have mentioned were a whit more fortunate in this respect. Now the case is entirely different, and the present difficulty is, not to find facts, but to make a selection, and to marshal those that are chosen in the short time at our disposal.

The true key to the interpretation of the phenomena of muscular action, as it seems to me, is to be found in the discoveries which have recently taken place respecting the electrical condition of muscle and nerve; but before attempting to find and apply this key, it will be well to see how muscle behaves under the action of blood and nervous influence.

I. Arguing from the comparative anatomy of muscle it would seem as if muscle were not most disposed to contract when it is most liberally supplied with blood. It would seem as if the degree as well as the duration of contraction were inversely related to the supply of blood. Thus the degree and duration of contraction is greater in the voluntary muscles of fishes and reptiles than in the voluntary muscles of mammals and birds: greater in the muscles of any given animal during the syncope of hibernation than during the fever of summer life.

The fact, moreover, that rigor mortis may be “relaxed,” and the lost irritability restored to the muscle by the injection of blood into the vessels—a fact which has been abundantly demonstrated by Dr. Brown-Sequard* and Professor

*Comptes Rendus, June 9th and 25th, 1851.
Stmannius—would appear to be in direct contradiction to the idea that the muscle is in any way stimulated to contract by the blood.

One of Dr. Brown-Sequard's experiments was upon the arm of a criminal who had been guillotined at 8 a. m., on the 12th of July, 1851. The experiment, which consisted in injecting and re-injecting a pound of defibrinated dog's blood into the brachial artery, was commenced at 11 p. m.—fourteen hours after decapitation. At this time the limb was in a state of perfect rigor mortis. As the blood began to penetrate into the vessels, some reddish spots appeared in different parts of the skin of the forearm, of the arm, and more particularly of the wrist. Then these spots became larger, and the skin acquired the appearance it has in rubella. Soon afterwards the whole surface had a reddish-violet hue. A little later, and the skin had acquired its natural living color, elasticity, and softness, and the veins stood out distinct and full as during life. Then the muscles relaxed, first in the fingers, and lastly in the shoulders, and on examination they were found to have recovered their lost irritability. At a quarter to twelve the muscles were more irritable than they had been at five p. m., at which time the corpse was first examined; and this increased irritability was kept up without abatement until 4 a. m., when fatigue compelled the experimenter to abandon his labors. When the experiment was commenced, the temperature of the blood 73° Fah., and that of the room 66° Fah.

The subject of another experiment was a full-grown rabbit which had been killed by haemorrhage. Dr. Brown-Sequard waited until rigor mortis had fully set in, and then injected the defibrinated blood of the same animal into one of the hind limbs, which limb had previously been removed from the body. Fifteen minutes after the commencement of the injection the muscles had lost their stiffness, and responded readily to mechanical and galvanic irritation. From this time, through the night, until 3 p. m. on the following day, the blood was injected at intervals of from 20 to 30 minutes, and during the whole of this time the muscles remained perfectly soft and irritable. All this while, also, the muscles of the other hind limb of the same animal, and of the rest of the body, were in a state of perfect rigor mor-

tis. From 3 to 4½ p.m. the injections were discontinued. On resuming the experiment after this interval of an hour and a half, the limb, with the exception of a few bundles of fibres here and there, had again become rigid. The effect of the injections was precisely as at first; and when, from the lateness of the evening, the experiment was again abandoned, the muscles were perfectly soft and irritable. On the morning following, the limb upon which the injections had been practiced was in a state of perfect cadaveric rigidity, while the muscles of the rest of the body, which had been left to themselves, were already beginning to pass out of this state. On the third morning, the rigor mortis of the left limb was undiminished, and the other muscles of the body were soft and in an advanced state of putrefaction.

About the time Dr. Brown-Sequard was engaged in these interesting experiments, Professor Stannius, without the knowledge of what was being done in Paris, was carrying out an analogous series of inquiries in Rostock.

On the 21st of July, 1851, at 7½ a.m., Professor Stannius put a ligature around the abdominal aorta and crural arteries of a puppy. About a quarter past ten, the muscles had begun to stiffen in the parts from which the blood was excluded. At a quarter to eleven, both hinder limbs were stretched out, and perfectly stiff and cool. At twenty minutes past eleven, the ligatures were loosened, and the blood was seen and felt to penetrate into the empty vessels. At a quarter to twelve, the natural warmth had returned in some degree, and the right hinder limb was a little more flexible than the left. At noon, both the limbs had recovered their flexibility, and it appeared once as if the left had moved spontaneously, but no sign of pain was caused by pinching the toes. At half-past twelve, the muscles of the paralyzed limbs contracted everywhere upon the application of the galvanic poles; and at one point the galvanism seemed to cause pain, for the animal, which was before quiet gave a sudden plunge forwards. Death happened unexpectedly at twenty-eight minutes past twelve p.m.

A similar experiment was performed upon another puppy early in the morning of the following day. At noon, in this case, there was no evidence of stiffness in either of the hind limbs, but the muscles below the knee had ceased to respond to the touch of the electrodes. At a quarter-past two p.m., both these limbs were stretched out and rigid, and all evidences of irritability were at an end. At
twenty-five minutes to three, the ligatures were untied. At twenty-five minutes to four, the application of the electrodes caused strong contraction in the muscles of both thighs, and weaker contractions in the muscles of the left leg below the knee, while, at the same time nearly all traces of rigidity had disappeared from both limbs. At twenty-five minutes to six, every trace of stiffness had disappeared, and the muscles responded perfectly to the prick of a knife, as well as to the touch of the electrodes. On the following morning the animal was found dead, and with the rigidity of death fully established everywhere.

Now, that the stiffness of which mention is here made is perfectly identical with rigor mortis will appear from the following experiment. In this experiment, the aorta and crural arteries of another puppy were all carefully tied. Four hours afterwards, the muscles behind the ligature were perfectly rigid, and all traces of irritability had disappeared in them. In the evening of the day following, the animal was still alive—at least in its anterior half—and, upon the whole, it was comparatively fresh and quiet. Twelve hours later, the animal was found dead, with the parts before the ligature in a state of rigor mortis, and with the parts behind the ligature, which had been rigid before death, flaccid, moist and partially putrescent; in other words, the parts behind the ligature were in the state which comes on after rigor mortis, and hence it follows that the stiffness which existed in these parts before the complete death of the animal must have been identical with rigor mortis.

Here, then, are certain experiments which would seem to show that the influence of the blood, be this what it may, is exercised in counteracting the contraction of rigor mortis; and this inference, which I had drawn from the experiments of Dr. Brown-Sequard before my attention was directed to those of which Professor Stannius, is the same as that which the last-named physiologist has drawn from his own experiments.

There are, however, certain facts* which seem to show that muscle is affected differently by arterial and by venous blood, and these facts have led Dr. Brown-Sequard to think that the office of arterial blood is to minister to the nutrition of muscle and other tissues, and to the storing up of

*Comptes Rendus, No. xvi, 1857.
contractile and other forms of power, and that office of venous blood is to supply a stimulus, by which the power derived from the red blood is called into action—a view according to which the function of the black blood is no less important to the interests of the economy than that of arterial blood.

The chief argument in favor of the idea that venous blood is endowed with these stimulating properties is based upon the well-known fact, that the muscles contract violently when the whole mass of blood becomes venous, as in asphyxia. Another argument is derived from the fact, also found amongst the phenomena of asphyxia, that the left ventricle of the heart appears to pulsate more violently during the first moments of the process of suffocation; for at this time the pulse is firmer and fuller, and the mercury rises to a higher point in the hemodynameter. Other arguments are based upon some original experiments of Dr. Brown-Sequard, in which it was seen that certain involuntary muscles might be thrown into or out of a state of contraction by injecting alternately black and red blood into their vessels. In one of these experiments, the uterus of a pregnant rabbit was separated from its connexions with the cerebro-spinal centres, and blood injected into the aorta. On injecting black blood, the uterus contracted, and two or three foetuses were expelled; on injecting red blood, these contractions immediately passed off.

But, it may be asked, is it not possible that these convulsions and contractions may be due to the want of arterial blood rather than to the presence of venous blood? And is not such an explanation the less difficult of the two?

It is certainly true that an animal is as violently convulsed when it is bled to death as when it is strangled to death. It is certainly true, that is to say, that an animal is as violently convulsed when its vessels are suddenly emptied of blood as when they are allowed to become suddenly filled with black blood. And this being the case, it is surely more easy to refer the convulsions attending upon haemorrhage and suffocation to absence of arterial blood—seeing that this absence is common to both cases—rather than to the presence of venous blood, seeing that this cause can only operate in one case. At any rate, with the fact of convulsions from haemorrhage to account for, it is evident that venous blood cannot be regarded as essential to convulsion.

Now can it be allowed that the fuller pulse of the first
moments of suffocation is due to increased stimulation of the left ventricle on the part of the venous blood. for this phenomena may be the result of the difficulty which the unarterialized blood experiences in getting through the system's capillaries—a difficulty by which the ordinary contraction of the ventricle is made to tell with increased force in distending the coats of the intermediate arteries.

And it is certainly unnecessary to assume the existence of any stimulating properties in the venous blood to explain the contraction of the uterus which was brought about by injecting such blood into the aorta of a pregnant rabbit: for is it not a well-known fact that the uterus has often contracted and expelled its contents when pregnant animals have been bleeding to death in the service of science?

It would seem, also, that an argument in favor of the idea that the contraction in these several cases is really due to the absence of arterial blood may be found in a recent experiment, in which Dr. Harley seems to show that strychnia and brusia act, in part at least, by preventing the arteriolization of the blood. In this experiment, Dr. Harley measures two equal portions of the blood of a calf into graduated tubes, and mixes a small quantity of strichnia with one portion. Then, after thoroughly saturating the blood in each tube with oxygen by repeatedly shaking it with fresh quantities of air, he corks it up with 100 % cent. of air, and continues the shakings at intervals. At the end of 24 hours the air within the tubes is analyzed by Bunsen's method: and, as the result of this analysis, it is found that the air which was in contact with the blood containing strychnia contains more oxygen and less carbonic acid than the air which had been left in contact with the simple blood—thus:

<table>
<thead>
<tr>
<th>Composition of Air after having been in contact with Simple Blood for 24 hours</th>
<th>Composition of Air after having been in contact with Blood containing Strychnine for 24 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common Air: Oxygen . . .</td>
<td>20.96</td>
</tr>
<tr>
<td>Carbonic Acid</td>
<td>.002</td>
</tr>
<tr>
<td>Nitrogen . . .</td>
<td>79.038</td>
</tr>
<tr>
<td>100.00</td>
<td>100.00</td>
</tr>
</tbody>
</table>
In other words, the strychnia has prevented the blood from absorbing oxygen and giving off carbonic acid. It has prevented the blood, that is to say, from becoming arterial, and for this reason the action of the poison may be said to be equivalent to actual loss of blood. It may be said, indeed, to be equivalent to very copious loss of blood, for in the experiment of which the results are given in the accompanying table, the addition of a very minute portion of poison may be considered as equivalent to a loss of two-thirds of the whole amount of blood, inasmuch as this addition destroys two-thirds of the power which this blood had of absorbing oxygen, and of so becoming arterial. When bruicia is used, the only difference is one of degree.

The action of the blood, then, be that what it may, would seem to be exerted in counteracting, rather than in causing muscular contraction. At any rate there would seem to be no reason, so far as we have seen, for supposing that blood is in any sense a stimulous to muscular contraction.

II. It is very far from certain that muscular contraction is produced by any stimulation derived from the nervous system. On the contrary, there are certain facts which seem to be altogether fatal to such an opinion.

One of these facts is to be found in the extraordinary increase of muscular power in the hind legs of a frog after the division of the spinal cord. In illustrating this fact, Dr. Brown-Sequard attaches a small hook to one of the hind legs a little above the ankle, and tests the muscular power of the limb by hanging weights upon this hook. First of all, he finds a weight which is just a little heavier than that which the muscles of the limb are able to lift, when they are thrown into contraction by pinching one of the toes. This being done, he then divides the spinal cord immediately behind the second pair of nerves, and goes on testing the muscular power of the paralysed legs by changing the weight upon the hook. The results are very strange. Immediately after the division of the cord, the muscular power put forth by the weighted leg when its tip is pinched is sometimes nil, but generally it is about a third or a fourth of what it was before the operation. Fifteen minutes later this power is evidently rallying. In twenty or twenty-five minutes it has recovered all it had lost. At the end of an hour it is greater than it was before the operation—perhaps doubled. An hour or two later still, it is certainly doubled possibly trebled; and from this time up to the twenty-fourth...
hour, when the increase generally attains its maximum, it goes on slowly augmenting. The particulars of two experiments with very fine frogs (A and B) were as follows, the weights raised being expressed in grammes:

Frogs experimented upon . . . . . . A. B.
Grammes raised before the division of the spinal cord 60 60
   Immediately afterwards . . . 20 10
   In five minutes . . . . . . . . . . . . 45 30
   In fifteen minutes . . . . . . . . . . . 60 40

Grammes raised after the division of the spinal cord.
   In twenty-five minutes . . . . . . 80 60
   In one hour . . . . . . . . . . . . . . 130 100
   In two hours . . . . . . . . . . . . . . . . 140 120
   In four hours . . . . . . . . . . . . . . . . 140 130
   In twenty-four hours . . . . . . . . 150 140
   In forty-eight hours . . . . . . . . 150 140

At this latter point the muscular power may remain nearly stationary for six, ten, fifteen, or twenty days. In a month, if the animal lives, the power in question will, in all probability, have fallen to its original value before the operation. In six, seven or eight months it may not be more than a third or a fourth of this value. It is possible, however, that some part of this failure might have been prevented if care had been taken to exercise the paralysed limbs by galvanism.

There are other experiments, moreover, which show plainly that the muscular power is similarly augmented when the muscle has been altogether cut off from the spinal cord, and which thus contradict Dr. Marshall Hall's notion that this increase of muscular power, after division of the spinal cord, is due to increased stimulation on the part of the cord, which increased stimulation has come into play because the controlling influence of the brain has been cut off.

In one experiment, for example, Professor Engel clips out the whole of the cerebro-spinal system of a frog, bones and all, and, after five or ten minutes, he finds that the muscles have become so irritable as to be thrown into a state of contraction by a blow upon the table. He finds, indeed, that the muscles under these circumstances are quite as irritable as they are in the case of a narcotized frog.

In another experiment, Dr. Brown-Sequard divides the spinal cord immediately behind the roots of the brachial nerves, and after this he cuts through the nerves proceeding to one of the hind legs. Two hours afterwards, he
separates both hind limbs from the body, and on comparing their irritability by pinching and galvanizing the nerves, he finds that the "irritability is augmented" in both limbs, and mostly in that which had been previously cut off from the spinal cord by the division of its nerves.

But what of this augmented irritability? There is, no doubt undue readiness to contract on the part of the muscles and undue readiness to bring about contraction of the part of the nerves; but there are sundry difficulties, of a very grave character, which must be removed before it can be allowed that this change is owing to augmented irritability. Two such difficulties are presented by the two following experiments in Dr. Harley's very valuable investigations upon the physiological action of strychnia and brucia.

In one of these experiments the hearts of two frogs are cut out and placed, one in distilled water, the other in a weak solution of strychnia or brucia. Placed in distilled water, the heart is found to go on pulsating for a longer time still, even for hours; placed in the poisoned solution, the heart is found to cease beating almost immediately, and to be in a state of rigor mortis before the other heart has lost any of its power of contracting rhythmically.

In the other experiment, instead of the hearts of two frogs, the two hind limbs of the same frog are placed, one in distilled water, and the other in a solution of strychnia or brucia of tolerable strength, and arrangements are made for testing the irritability of the two limbs by galvanism. This is the experiment. The result, which is not less marked than in the case where the hearts are concerned, is that the limb immersed in plain water contracts strongly for some time after the limb is immersed in the solution of strychnia or brucia has passed into the state of rigor mortis.

It would seem, indeed, as if the poisons acted upon the irritable tissues in the same way as that in which they have been seen to act upon the blood; for, as Dr. Harley points out, "the destruction of the irritability of the muscle may be supposed to imply the suspension of that process of absorbing oxygen and giving off carbonic acid—the so-called respiration of muscle—which is certainly most energetic when the irritability is most marked." But be the explanation what it may, the fact remains, that the so-called irritability dies not most rapidly when the irritability is said to be most augmented—for in no case is the irritability more augmented than in cases of of strychnine poisoning:
and thus, instead of ascribing the undue disposition to contract to augmented irritability, it would seem more in accordance with the fact to suppose that this undue disposition to contract is due to a change which is the very opposite of augmentation. At any rate, after what has been said, it is impossible to refer the phenomena of a so-called augmented irritability to augmented innervation.

Nor does the permanent contraction, which comes on sooner or later in paralysed parts, appear to be in any way dependent on the stimulus of nervous influence. This permanent contraction comes on sooner or later in all paralysed parts, and the fact may easily be verified experimentally. Thus, after destroying the spinal cord in the lumbar region of pigeon, the muscles of the paralysed parts are at first soft; in a few days they become somewhat hard; after a few days they pass into a state of permanent contraction—contraction by which the legs are kept extended and divergent. The muscles, indeed, would seem to become contracted, because the action of the nervous system upon them was suspended, and to remain contracted because this state of things was permanent.

It would seem, also, as if the facts which still remain in the background are equally unfavorable to the idea that muscular contraction is produced by any stimulation derived from the nervous system. It is impossible, for instance, to look upon the convulsions produced by haemorrhage, and find a reason for believing that they are connected with undue stimulation on the part of the nervous system. For if it be a law in physiology, as it undoubtedly is, that the functional activity of an organ is proportion to the activity of the circulation in that organ, then it follows that the action of the nervous system must be at zero during the convulsions of haemorrhage, seeing that at this time the vessels are almost empty of blood, and the heart is well-nigh still. The inference, also, which may be drawn from the general fact of convolution in haemorrhage is confirmed and rendered more circumstantial by some recent experimental investigations of Dr. Kussmaul and Tenner,* of which the importance cannot well be overrated.

In one of the experiments performed by these physiolo-

gists, threads are passed behind the common-innominate and left subclavian arteries of a rabbit,* and arrangements made by which these threads may be tied and untied in a moment. On tying the ligatures, the animal was violently convulsed; on untying the ligatures about sixty seconds later, the convulsions which were then raging at their height, were instantly brought to an end. Convulsion is brought on, that is to say, by preventing the flow of blood to the brain, the medulla oblongata, the upper part of the spinal cord, and the cervical ganglia of the sympathetic nerve; and these convulsions are instantly suspended by allowing the blood to return to those organs. In other words, the convulsions would seem to be connected with a state of inaction of one or more of the nervous centres named; for how can there be any action where blood is wanting? Nor can it be said that there may be over-action in the rest of the spinal cord and in the thoracic and abdominal ganglia of the sympathetic system—over-action in consequence of part of the blood which cannot find its way to the head and neck being added to the blood which, under ordinary circumstances finds its way to these organs—for there is another experiment which furnishes conclusive evidence upon this point.

In this experiment the subclavian arteries of a rabbit are tied at their origin, and a ligature is also placed around the arch of the aorta, a little beyond the opening of the left subclavian artery. The ligatures, that is to say, are so placed as to bring about a result which is the very opposite of that which was secured in the last experiment. In that case the blood was cut off from the head and neck, and the circulation confined to the trunk and limbs; in this case the blood is cut off from the body and limbs, and the circulation confined to the head. In this case, that is to say, the vessels of the brain, medulla oblongata, upper part of the spinal cord, and the cervical ganglia of the sympathetic nerve, receive more than their proper share of blood, for all the blood of the body is diverted in this direction; while the rest of the spinal cord and the thoracic and abdominal ganglia of the sympathetic nerve receive no blood at all.

* In a rabbit, the right subclavian and both carotids usually commence in a common innominate artery, while the left subclavian springs independently from the arch of the aorta.
And what is the result? The result is paralysis of the parts behind the ligatures, without convulsion. In one or two instances the paralysis was preceded by trembling; but in no instance was there convulsion, or anything approaching to convulsion. It was ascertained, also, that this absence of convulsion was not due to paralysis of the spinal cord from want of blood, for on compressing the carotids so as to prevent the flow of blood through these vessels the animal was instantly seized with violent convulsion.

Here, then, are two experiments, the significance of which cannot well be misunderstood. In the first, we see that convulsion is instantly arrested by allowing the blood to return into the great vessels of the neck; in the second, we see that convulsion is not caused by cutting off the blood from the body and limbs, and in that way increasing the rush of blood to the head and neck. In the first we see, further, that convulsion is instantly brought about by tying the great vessels of the neck; in the second we see that the same result is brought about by compressing these vessels. In other words, we see that convulsion is absent when the presence of an undue quantity of blood may be supposed to imply an over-active state of the cranial and cervical nervous centres, and that convulsion is present, when, from complete want of blood, these centres must be supposed to be in the very lowest degree of activity compatible with life.

In the second of these experiments, we may also find proof that the convulsion is equally unconnected with an over-active state of the spinal cord, and of the thoracic and abdominal ganglia of the sympathetic system; for, after the circulation has been for some time at an end in these nervous centres, and when, therefore, the functional activity of these centres must be nil, convulsion is brought about by compressing the carotids.

And lastly, an indirect argument in support of the inference arising out of these experiments—that it is the absence and not the presence, of blood in the cranio-cervical nervous centres which has to do with the convulsion—may be derived from the fact that drowsiness, and not convulsion, is the consequence of that capillary injection of these centres arising from the division of the sympathetic nerve in the neck, or of that venous engorgement brought about by tying the jugulars, or that double arterio-venous confection which happens when the sympathetic nerves are divided
in the neck and also the jugular veins tied in the same animal.

As with blood, then, so with the "nervous influence," the evidence throughout would seem to be altogether opposed to the idea that the action upon muscle is that of a stimulus to contraction: but upon this point it may be well to refrain from forming an opinion until we have had an opportunity of considering some facts which find a place more conveniently in following sections.

[TO BE CONTINUED.]

*Rhus Toxicodendron in Paralysis.* By Dr. Michalowski.

Dr. Michalowski advises the use of fresh *Rhus toxicodendron* in paralysis, and reports the following case in support of his recommendation:

A farmer, 35 years of age, had been suffering for two years with violent rheumatic pain in the bones and joints of the spinal column and of the lower extremities. At last swelling of the joints supervened, and exostoses of the size of a hen's egg appeared at many points of the vertebral column, and two similar tumors, as large as a child's head, on the transverse rami of the pubic bones. The lower extremities of the patient were completely paralyzed: his digestion was bad, and his urine was discharged by drops. After using many different remedies without success, Dr. Michalowski tried the extract of *Rhus toxicodendron*, prepared from the plant, freshly gathered in botanical gardens. He administered one grain of the extract, made into a pill, with half a grain of the leaves. After the patient had taken two ounces of the extract and one ounce of the leaves he was completely cured. During this treatment the swellings of the bones diminished in size: toward the end of the cure the patient had the sensation in his feet and in the sacral region, as if he were pricked by pins: he also had the feeling of a current going from the sacral region down into his feet. Once only, the administration of the medicine had to be interrupted, as the patient complained of pain and a burning sensation in his throat.
EDITORIAL AND MISCELLANEOUS.

OUR PRESENT NUMBER,

Our readers will observe that our present number contains over one hundred pages of reading matter. This issue opens with the valuable investigation into the Marls of Georgia and the Adaptation of the various Soils of this State to different kinds of Culture, by our colleague, Prof. Joseph Jones, Chemist of the Cotton Planters' Convention. This valuable series of papers is now concluded, its completion having been presented in the form of an extended Report to the Association. As many of our readers must have been deeply interested in Professor Jones' agricultural researches, we refer them to the Book Stores of this city for the volume containing this Report. It is the privilege of the country practitioner of Medicine to relieve the tedium and drudgery of the daily round by agricultural pursuits, on a more or less extended scale, and we therefore, have no apology to offer for occupying a portion of our pages for the several last numbers with matter bearing on Scientific Agriculture; but those who may have felt less interested in the discussion, have still no reason to complain, as, from an unusual press of original and selected matter, the present number is nearly one-half larger than our usual edition.

We call the attention of our readers to the Opening Lecture of a series, on Outgrowths of the Cervix Uteri, by Dr. Joseph A. Eve, Professor of Obstetrics, &c., in the Medical College of Georgia. Dr. Eve's vast experience and extended reputation in this department of his branch, will certainly give great value to these Lectures and render them a most useful contribution to the Literature of these important subjects.

The present issue of this Journal has been greatly delayed, but justice requires that we should exonerate our indefatigable and liberal publisher from any charge of delinquency. The delay was solely attributable to the Editor, a severe dissecting wound having incapacitated him for furnishing editorial for the number, and even now, chirography is performed, not without pain.

Our Correspondents will remember that this is the beginning of our
volume; we wish every number to be filled with useful, practical matter, doing credit to the Medical Literature of the South and contributing its valuable quota to that of American Medicine. We invite their earnest co-operation with us, in keeping this journal what it has ever been, the liberal exponent of true Medicine, a garner for the treasures of all parts of the world, and the dispenser only of Medical doctrines wherever it may be read.

On Ureaemia.—By Professor Jaksch.—Vierteljahrschrift für die praktische Heilkunde, xvii. Jahrgang. 1860.—The author of this paper holds that there are two varieties of uremia which should be carefully distinguished; one being caused by the decomposition of urine and absorption of carbonate of ammonia into the blood (ammonaemia), the other being the variety which accompanies Bright's disease of the kidneys. He has seen the former occur under the following circumstances:

1. In torpor and paralysis of the bladder.
2. In dilatation of the pelvis and callices of the kidney in consequence of the ureters being blocked up.
3. In renal abscess, renal tuberculosis and sacculated kidneys.

The following are the main differences characterizing the two forms of ureaemia; we shall, to save circumlocution, use the word ammonaemia as the name of the one, and Bright's ureaemia as the name of the other:

1. In advanced ammonaemia the urine discharged from the bladder manifests a strong ammoniacal odor, which Professor Jaksch has never noticed in any stage of Bright's ureaemia.
2. Dropsical symptoms, either acute and febrile, or chronic and afebrile, have not been observed in ammonaemia.
3. Advanced ammonaemia is characterized by persistent dryness of the mucous membrane covering the mouth and fauces, as if every particle of moisture had been removed by blotting-paper; the membrane looks dry and shining, and the dryness even extends to the mucous membrane of the nose, the conjunctiva, and even to the chordae vocales; these symptoms do not occur in Bright's ureaemia.
4. The distinctly ammoniacal odor of the air exhaled, and of the cutaneous secretions of patients affected with ammonaemia, does not occur in Bright's disease.
5. Patients suffering from ammonaemia always show a marked dislike to meat, and especially brown meats, even if their affections have not advanced very far; a feature rarely seen in the other variety.
6. Professor Jaksch has never observed in Bright's disease the violent intermittent rigors, stimulating intermittent fever, which occur in ammonaemia.
7. In none of the cases of ammonaemia were convulsive or epilepticiform attacks, nor gomphy or diptheritic exudations noticed.
8. Disturbed vision, as produced in Bright's disease by exudation on the retina, does not appear to take place in ammonaemia.
9. Chronic ammonaemia is characterized by a uniformly pale and sal-
low complexion, and by gradually increasing emaciation; very acute and advanced ammonæmia is associated with very rapid wasting of features, and muscular debility amounting to paralysis.

10. In all cases of ammonæmia which ran a rapid course there was vomiting, with concurrent or consequent diarrhea; in chronic ammonæmia both phenomena were often entirely absent, or only occurred temporarily.

11. In ammonæmia, whether acute or chronic, Professor Jaksch has always seen death occur after sopor, varying in duration from several hours to several days.

The author of this valuable and interesting paper gives numerous cases illustrative of his views, and enters very fully into the various questions connected with diagnosis and treatment, for which we are unable to make room.

On Glycosuria as an Accompaniment of Marsh Fever.—By Dr. Burdel, Physician to the Vierzon Hospital.—(L'Union Médicale, No. 139, 1859.)—Dr. Burdel regards marsh poison as a myth, and looks upon marsh fever as result of a perturbation of the cerebro-spinal centre and the sympathetic system, adopting very nearly the same phrase as the one by which Bernard defines glycosuria. The author of the present paper, in his researches into the nature of marsh fever, has confirmed the above view of its character by ascertaining in the majority of cases the presence of sugar in the urine.

Dr. Burdell employed the test with liquor potassae, Felling's liquids, the test with bismuth and potash or carbonate of soda, and the yeast test. It was especially in the first commencement of the attack that the quantity of sugar was considerable; it diminished gradually towards the termination of the paroxysm, and generally disappeared entirely during the interval. The closer the attacks approach one another, the larger the amount of sugar.

In 80 cases of well marked intermittent fever the author uniformly found sugar; in 30 other cases, in which the fever was at first intermittent and subsequently become remittent, the sugar was present, but only in small quantity and for a brief space. In 2 cases of intermittent fever following typhoid fever, a considerable quantity of sugar was shown to be present.

In the cases presenting the largest quantity of sugar, as much as 10 per 1000 was found.

Woorara.—Dr. Vella, the physician who applied this sub stance in a case of tetanus on the battle-field of Magenta, reports to the Academie des Sciences, a number of experiments made by him to establish its value as a therapeutic agent. He claims that worara besides being a sovereign remedy in tetanus, is almost an antidote for strychnia, to which conclusion he has come from his experiments upon dogs.—Scéance du.

Gonorrhea Treated with Tartar-Emetic.—In an article in the Charleston Medical Journal and Review, by Dr. P. Porcher, tartar-
emetic is recommended in gonorrhrea. In regard to his method of using it, he has the following:

"In the formative stage of the disease, soon after its appearance—within the first 15 to 36 hours, if possible and before the inflammation has made any advance, order the recumbent posture to be preserved and the use of warm mucilaginous drinks, with nitre and doses of tartar-emetic sufficient to keep up constant nausea. The sedative circulates to the remote parts of the system, the progress of the inflammation is thus put an end to, and in my experience, with but one exception, the disease completely arrested."

**Hoffman's Anodyne in Delirium Tremens**—In the same article above referred to in the same journal. Dr. Porcher speaks highly of Hoffman's anodyne in delirium tremens. He says he has used it with satisfactory results in eight cases—"one drachm being administered, diluted with water, repeatedly, until nervous tremor was allayed and sleep induced." In the insomnia connected with this disease, he thinks opium has better effect when combined with tartar-emetic, as follows—

"R.—Tr. opii., gtt. xl; T. emetic, gr. \(\frac{1}{3}\), repeated every half hour till sleep is induced."

**Large Doses of Opium in Centric Convulsions in Children.**—In the same paper above referred to, Dr. Porcher commends opium in full doses, in cases of convulsions in young children, when not dependent upon worms or errors in diet. An illustrative case is reported. Dr. Porcher suggests that a combination of chloroform and laudanum would probably be beneficial in these cases. For the last five years we have been in the habit of trusting these cases to chloroform by inhalation, and the results have been so satisfactory that we have had no reason to seek further for remedial aid.

** Neuralgia.**—In the Charleston Medical Examiner for June, Dr. L. D. Robinson has an article upon neuralgia, in which his views of its pathology are given, and also his plan of treatment. We subjoin only the treatment. In a case reported, the treatment advised, which he says was that usually advised by him, was the following:

- **R.**—Chinoidine, 24 grs.
- Pulv. Capsicum, 5 grs.
- Strychnia, 1 gr.

- **M.**—flat. pil. No. 10. Dose—a pill before each meal.

After using the above sufficiently long to break down the paroxysms, and give the patient relief, we prescribe the following:

- **R.**—Quevonne's iron, 60 grs.
- Quinine, 60 grs.
- Ext. Hyosciami, 40 grs.
- Pulvis Capsici, 20 grs.

Divide into 40 pills. Dose, a pill after each meal and to be continued until completely relieved of debility."