effects, however, are generally temporary, for the reason that they provoke a hæmatoblastic crisis,which tends to bring back the blood to the state in which it was before the hemorrhage, and if the latter be often repeated, the hæmatopoietic formations exhaust the organism, and speedily produce grave disorganizations in the different viscera.

Local bloodletting has general effects analogous to general bloodletting, but it has local effects quite different. The mode of performance of these local abstractions of blood is very variable; sometimes we open the vein directly, sometimes we have recourse to mechanical means, as wet cups, or we employ leeches. Local bleeding, properly so called, that is, the opening of certain veins by the lance, has fallen into greater desuetude than venesection at the bend of the elbow. Nevertheless, latterly, Arango, Chaparr, Mestivier, and especially Aran, have endeavored to revive the old practice, vaunted by Hippocrates, Galen, and Alexander, of Tralles, of bleeding from the ranine veins of the tongue, while Seutin, Cruveilhier, and Denucé have proposed to take blood from the nasal mucous membrane, thus going back to another ancient practice. At the present day, despite these tentatives, local venesections are abandoned, and we have recourse only to leeches and wet cups.[1]

Cupping is to-day very much in use, in spite of our repugnance to let blood, and you see it employed in a considerable number of affections, and in particular in ocular therapeutics.

Here, as in the case of venesection, I refer you to your manuals of minor surgery for the details of the operation, reminding you only that under the name of *pneumodern*, Montain, of Lyons, and under the name of *terabdele*, Damoiseau, have devised cupping apparatus similar to those which Heurteloup and, more recently, de Wecker devised and used in inflammatory affections of the eye, and which are veritable artificial leeches.

As for leeches, they render us daily great service, although we have much restricted their usage.[2] The application of these leeches, the hemorrhages which result, the means of augmenting the flow of blood, or of arresting it—these are points with which you are all familiar, and which you learned at the commencement of your medical studies.

[1] Cupping apparatuses are too well known to require description in this place. The instrument by which the air is exhausted by means of a pump is much the more advantageous. The apparatus with rubber ball, operated on the principle of the modern breast-pump, is much employed; at the same time only a partial vacuum is produced by it, and its action is less energetic than that of the pump apparatus.

An interesting modern invention is the little scarifier, furnished with an air exhauster and described under the name of artificial leech. That of Heurtloup is the most used. These artificial blood-suckers are to-day reserved entirely for ocular affections. (*a*)

[2] The leech belongs to the class Annelidæ and to the order and family Hirudo. The species employed in medicine are especially the gray leech (Hirudo medicinalis), the green leech (H. officinalis); this kind is greener than the preceding, and the belly is not spotted; the dragon leech (H. trochina), which has on its back six rows of reddish or black points.

Moquin Tandon estimates that one officinal leech of small size will draw twice its weight of blood. This estimate is less that the reality, for an average leech will take almost an ounce.

To encourage the leeches to take hold it has been advised to wipe them with a linen cloth before applying them, or to dip them in wine.

Various processes have been recommended to stanch the bleeding produced by leeches. One of the best consists in closing the puncture with a *serre-fine*.

Statistics (which it is not necessary to produce here) show that there has been a steadily decreasing employ of leeches in the hospitals of Paris from 1820 to 1875, inc.

Thus, from an annual expenditure in 1820, of ten thousand francs a year, for the single item of leeches in the hospitals; in 1875 the amount expended was only eighteen hundred francs; a remarkable diminution. It is also worthy of the remark *à propos* of these figures, that the number of patients attended in the hospitals is to-day double, if not almost triple what it was in 1820. (*a*)

(*a*) Mestivier, on Bleeding from the Ranine Veins in Diseases of the Pharynx (Bull. de Thérap., t. 52, p. 12, 1857); Arango, Treatment of Quinsy by Bleeding from the Ranines (La Union, January, 1883); Chaparr (Gaz. hebd. de Méd., April, 1855); Aran, Bleeding from the Ranine Veins in Diseases of the Larynx and Pharynx (Bull. de Thér., t. 52, p. 105); Denucé, Bleeding Practiced from the Nasal Mucous Membrane (Journ. de Médicine de Bordeaux, August, 1856).

(*a*) Lasègue et Regnault, La Thérapeutique jugée par les chiffres (Arch. gén. de méd., 6th Série, t. 29, p. 21)

I will now show you what are the physiological and therapeutical effects of local bloodletting—effects which, in some respects, surpass those of general bleeding.

Local bloodletting, whether by scarifications, by cupping, or by leeches, has a double action—a general effect and a local effect. When it results in an abundant loss of blood, it produces the same modifications as general bloodletting; the pulse rises, the blood-pressure falls, and the temperature is lowered. the most marked effect, however, and the one most often sought, is the local action, and this is determined in part by the hemorrhage, and in part by a revulsive influence provoked by the local pain.

As for the hemorrhage, the anæmiating action takes place not solely at the point where you apply the leeches or the cup, but it extends more or less far. Despite the affirmations to the contrary of Binz and Struthers, I persist in thinking with Johnson that a considerable area may be exsanguinated by the local bleeding, and this owing to the vascular communications which unite certain organs to certain points of the skin; owing also to the intimate connections of the cutaneous nervous filaments, which hold under their dependence the vaso-motor innervation of organs situated more deeply.

The *rôle* of the local pain determined by the punctures is as important as that of the hemorrhage. We have here, first of all, a substitutive effect, then a vaso-motor action. We know, in fact, and on this point I insisted when considering the revulsive method in its application to the treatment of diseases of the spinal cord, that revulsion produced in any point of the skin causes anæmia of organs more or less deeply situated. Hence it is that local bloodletting has remained one of our most powerful therapeutic agents to combat the element congestion and the element pain, and especially the association of these two elements.

I come now to the most delicate and difficult part of my subject—namely, the indications for bloodletting, general and local. We will begin with the first.

If you reconsider the physiological effects of bloodletting, you observe that these effects are very transient, and cannot be persistent, except on condition either that your bleeding be exceedingly abundant, or frequently repeated, *coup sur coup*, after Bouillaud's fashion and that of the ancient phlebotomists. While, therefore, these repeated venesections undoubtedly do produce durable results, it is necessary to keep in mind that, despite the hæmatoblastic crises which they determine, they are followed by a persistent anæmia, and, what is especially worthy of being remembered, by a tendency to fatty degeneration of different viscera; and one may well ask if the inconveniences and the dangers which result from this double pathological state do not far more than counterbalance the feeble benefits which are obtained from these abstractions of blood, so that to-day, all these facts being well weighed, everybody is agreed to solicit from phlebotomy only the transient effects which it can produce, and to resort to it only for relief of active and passive congestions of different organs.

There is especially one pathological condition where this depletion—temporary as it may be—of the circulatory system, by bleeding, may render us some service. It is when we have to do with those pulmonary congestions which are accompanied with asystolia, and especially those which are not linked to fatty degeneration of the heart. You understand how, in these asphyxiating periods of cardiac affections, a temporary depletion is sufficient to enable the heart to recover its habitual rhythm.

In the phlegmasiæ, properly so called, after the congestive period has gone by, and the exudation has formed, bloodletting can have little or no influence, as I explained to you when on the treatment of inflammation of the lungs.

Impotent to arrest the march of an inflammation, bleeding may nevertheless act the part of a prophylactic in these phlegmasiæ; and if experimentation in animals does not sufficiently explain these facts, clinical experience, and especially clinical surgery, shows us again and again the happy influence of general bloodletting in averting the inflammatory accidents which traumatisms determine. Hence it is that bloodletting, seldom employed in clinical medicine, is still utilized in clinical surgery.

In the treatment of the essential fevers, bleeding can have only an antipyretic effect, and I shall have more to say of this when I come to fevers. This antithermic action is purchased at the cost of a profound trouble inflicted on the economy; nor, for all that, is the course of the febrile phenomena affected thereby. The doctrine of microbes which, in our day, plays so important a part in the pathogeny of the infectious diseases, explains for us sufficiently the impotence of bloodletting in these pyrexiæ, since the removal of blood can in no way prevent the development of these micro-organisms in the mass of the circulating fluid.

Bleeding is indicated much more in the inflammatory fevers, or, at least, in those which accompany local inflammation—fevers which present often a great elevation of temperature, as pneumonia. When we refer to the physiological effects of bloodletting, it is easy to understand the ancient popularity and universality of this therapeutic measure, since, directed to an affection which, by its normal evolution, tends toward recovery, it relieves the oppression of the

patient, lowers the temperature, and gives a marked elevation to the pulse. But our predecessors were ignorant of the price which they paid for this passing amelioration.

Nevertheless, in certain cases of blood-poisoning, obscure in their nature, bleeding has a happy influence. Thus in the eclampsia of puerperal women general bloodletting, practiced heroically, has arrested the convulsions, and all authorities seem unanimous in recommending venesection in these cases, although we are unable to explain the curative action of this spoliative treatment.[1] You see then, gentlemen, that general bloodletting is indicated only in eclampsia and in certain congestive states, especially such as arise from temporary perturbations of the cardio-pulmonary circulation, and that even here the relief obtained from the depletion is only momentary.

Local bloodletting, by its double action in producing revulsion and opposing congestion, has applications to therapeutics which are much more numerous, and it is a very common practice to resort to this method in painful congestive affections. Thus in the pain which accompanies pneumonia and pleurisy, cups and leeches may give relief; in congestions of the spinal cord, of the kidneys, of the liver, and of the uterus local depletions often prove useful. As in bloodletting the revulsive effects are more powerfully remedial than those resulting from the loss of blood, you understand the superiority of wet cups over leeches, and they are therefore more in use.

Such are the considerations which I wished to present relative to bloodletting, and which show the mediocre but useful *rôle* which this therapeutic means is destined in the future to fulfill. They will, moreover, help to convince

[1] Baudelocque affirms that nothing can take the place of bloodletting in puerperal convulsions. Mme. Lachapelle is of the same opinion.

Depaul has carried out the practice of blood-letting to great lengths in puerperal cases. He is in the habit of letting blood to the amount even of 2,000 grammes. The results of his practice are seen in the following table by Charpentier:

AT THE MATERNITY.

Single bleeding, 36 per cent. deaths.
Repeated " 33 " "

OTHER OBSERVATIONS.

Single bleeding, 30.6 per cent. deaths.
Repeated " 21.6 " "

We may conclude from these figures that repeated bleedings have given better results than single bleedings.

Peter has resumed this investigation and concludes in favor of bloodletting, not only as a curative, but also as a preventive measure. It has even been recommended to employ bloodletting in all cases of uræmic convulsions, and Fonnsagrives and Peter have cited cases of speedy recovery under the use of these bleedings. (*a*)

(*a*) Lachapelle (Mme.), Pratique des accouchements, t. III, p. 29 et 30.—Depaul, Bull. de c'Acad. de Médic., 1854.—Charpentier, De l'influence des divers traitements sur les accès éclamptiques, thèse d'agrégation, 1872.—Peter, Leçons de Clin. Méd., t. II.—Fonnsagrives, Considérations pratiques sur l'action déplétive des émissions sanguines générales (Bull. de thér., t. II, p. 5, 1859).

you that, notwithstanding the opposition which we have been called to witness against bleeding in all its forms, and the decadence into which it has fallen, it ought not to be completely abandoned.

In the next lecture I shall treat of one of the consequences of bloodletting; I refer to anæmia and its treatment.

ON THE TREATMENT OF ANÆMIA.

SUMMARY:—History—Anæmia and Chlorosis—Different Kinds of Anæmia—Alteration of the Blood in Anæmia—Red Blood-Corpuscles, Their Composition—Oxy-Hæmoglobin—Evolution of the Globules—Essential and Symptomatic Anæmia—Chlorosis—The Importance of Enumeration of the Globules, and Dosage of the Hæmoglobin—Treatment of the Anæmias—Pharmaceutical Treatment—Iron—History—The Action of Iron—Absorption of Iron—Elimination of Iron—Mode of Introduction of Iron—Ferruginous Preparations—Reduced Iron—Oxides of Iron—Dialyzed Iron—Ferrous and Ferric Salts—Ferruginous Preparations in General—Ferruginous Waters—Artificial Ferruginous Waters—Choice of Ferruginous Preparations—Inconveniences of Iron Medication—Constipation—Blackening of the Teeth—Gastric Pains—Quantities of Iron Absorbed per Day—The Specific Action of Iron—Adjuvant Medications—Manganese—Arsenic—Hydrotherapy—Ærotherapy—Hygienic Treatment—Alimentation—Must We Treat All Cases of Chlorosis?—Pernicious Anæmia, Its Treatment.

GENTLEMEN: There are no diseases more common than the various forms of anæmia, and this age of ours is especially the age of anæmic patients. The treatment of anæmia is, therefore, worthy of your serious, earnest study.

Ever since Varandal, professor of the faculty of Montpellier, in 1620, introduced the term chlorosis into pathology, and Daumius, a century later, wrote the word anæmia, these two affections have been the subject of long discussions, some authorities making them two distinct diseases, others including them in the same description, and successive attempts have been made to found these opposing views on arguments drawn from clinical medicine and on arguments drawn from the chemical examination of the blood.[1]

[1] If the ancients understood anæmia, they have said little about it in their writings. In Hippocrates indeed the word *anaima* is found, and is applied to persons in a miserable exsanguinated condition. Galen makes no mention of anæmia.

In 1620 Varandal in his treatise on Diseases of Women, made mention of the pale color of certain patients, and proposed for this condition the word chlorosis. In 1706 Euth proposed the name oligæmia to characterize the lack of blood. In 1732 for the first time we find the word *anæmia* in the inaugural thesis of Daumius, Mich. Alberti being dean of the faculty. Then a few years later appeared the theses of Kutter and Behr on anæmia. Notwithstanding these works, anæmia was exceptionally admitted in France. Bouillaud in 1833 pointed out the anæmic souffles of the heart and blood vessels. Piorry called attention to local and general anæmias; finally the labors of modern hæmatology enabled us better to understand anæmia.

Then came the numerous divisions corresponding to the varieties of anæmia which were being studied, and an attempt was made to establish between anæmia and chlorosis distinctions more or less precise, and based more particularly on the alterations of the serum and the alterations of the globules. Thus Germain Sée admits four types of chronic anæmia: oligæmia corresponding to a diminution in the whole mass of the blood; globular anæmia; hydræmia, characterized by augmentation of the watery principles of the serum; disalbuminæmia in which there is diminution in the proportion of albumen. Moreover he establishes a distinction between chlorosis and anæmia. He regards chlorosis as a globular anæmia, resulting from nutritive impoverishment entailed by the demands of the reproductive functions and of growth. Jaccoud thus distinguishes anæmia from chlorosis: In