lutely safe.[1] They allay the excitement of the nervous system, diminish the sensation of burning heat, and enable us to maintain perfect cleanliness in our patients.

There are two ways of administering tepid baths. Some, as Ziemssen, Schutzenberger, and Laure, of Lyons, employ baths of decreasing temperature, and from 95° F. they lower the temperature of the water, in the course of ten minutes, to 77° F.[2] Others, and I am of their number, keep the warm bath at a constant temperature of five degrees below that of the patient, to wit, varying from 93° F. to 98° F. These baths should be of much longer duration than the cold baths, and without going as far as Reiss, who keeps the patient in them almost all the time, I am of the opinion, relying especially on the experiments of Thery, that it is sufficient to prolong them from twenty to thirty minutes.[3]

[1] Curry was among the first to vaunt the action of tepid baths in the treatment of typhoid fever. These tepid baths were, moreover, anciently employed by Hippocrates and Galen.

Dance, in 1831, recommended the employment of tepid baths in the treatment of typhoid fever. Hervieux in 1848 also devoted a chapter to the utility of these baths in dothinenteritis. Such baths at a constant temperature of 30° to 35° C., (87° to 95° F.) were shown by the experiments of Barthé and Berthornier made on themselves, to have caused lowering of the pulse from 16 to 20 beats and the temperature one degree.

Dujardin Beaumetz has noted the same effect in patients affected with typhoid fever and has seen the temperature fall two degrees and the pulse ten beats.(*a*)

[2] Ziemssen employs baths of decreasing temperature. He makes use of water of 33° C. (91° F.) of temperature at the commencement, then he adds cold water so that at the end of ten minutes the temperature of the bath is not higher than 23° C. (73° F.) These baths are administered four times in twenty-four hours, at six and ten o'clock in the morning, and six and ten o'clock in the evening.

Laure, of Lyons, has employed the same methods. The water was first used at an initial temperature of 30° C. (86° F.) and was cooled to 25° C. (77° F.) The duration of the immersion varies from fifteen to twenty minutes. The patient ought to make some voluntary movements while in the bath, or else be rubbed in front and on the back.

Schutzenberger employs baths of 25° to 30° C. (77° to 87° F.) and lets the temperature of the bath cool down (as it naturally would) from two to three degrees during the immersion, which is from fifteen to twenty minutes in length. (*b*)

[3] Riess employs permanent tepid baths in the treatment of typhoid fever; he places the patient on a hammock and makes him remain for several hours in a bath at a temperature of 88° F.

Afanowjew has employed the same method; he places his patients in a bath of from 75° to 85° F. on a rubber mattrass, the head resting on an air cushion. The maximum duration of the bath is three hours; two baths are given every day.

Hermann, on the contrary, considers these prolonged tepid baths of no advantage.

(*a*) Dance, Sur le traitment de la fièvre typhoide (Arch. Gén. de méd., 1re série, t. PXV, p. 186).—Hervieux, De l'emploi des bains tièdes et de leur utilité dans le traitement de la fièvre typhoide (Areh. gén. de méd., 4e série, t. XVIII, p. 28).—Barthé, Recherches sur l'emploi des bains dans la fièvere typhoide dans le but d'abaisser la temperature (thèses de Montpellier, 1871).—Berthomier, Des bains tièdes et de leur influence sur l'abaissement du pouls et de la temperature (thèse de Paris, 1874).—Dujardin-Beaumetz, Dè l'emploi des bains tièdes comparé à celui des bains froids dans le traitement de la fièvre typhoide (Soc. méd. des hôp., 22 décembre 1876).

(*b*) Ziemssen, Die Kaltwasserbehandlung des Typhus abdominalis, Leipzig, 1870.—Láure, De l'emploi du bain tiède de préférence au bain froid dans le traitment de la fièvre typhoide (Soc. des sc. méd. de Lyon, 1874).

These baths are repeated once or twice a day, the attendant having care to sustain the forces of the patient by giving him, during the bath, wine and meat broths.[4] I have always seen, under the influence of these tepid baths, typhoid patients with hyperpyrexia and delirium manifest a notable amelioration of the symptoms, become calm, and obtain quiet sleep.

I shall say little about the employment of refrigerant apparatus, not because I doubt their value—on the contrary, they are the only means which enable us to apply, systematically and rigorously, the refrigerant method—but because I have had no personal experience with regard to them. They are, in fact, quite complicated and costly, and this is why no one but their inventor, my colleague, Dumontpallier, has applied them in practice.[5] If we refer to the conclusions which he has recently formulated, these apparatuses have given him good results. We find means much more easy of application in cold affusions, lotions, and the wet pack, which can be used by anybody.

Affusions of cold water, or rather of sea-water, which was Currie's treatment of fevers, are no longer in use, and the cold lotions of which I have already spoken are far preferable.[6] These lotions of cold water are decidedly antithermic in their action, as no one who has watched their effect can have

They have no action in typhoid fever, and diminish neither the length nor the gravity of the disease. (*a*)

[4] Théry has studied the influence of prolonged baths on the circulation and calorification. Baths above 97° F. augment the circulation and the temperature; below 97° F. they lower them both. From 90° to 97° F. the fall is from four to six-tenths of a degree. This heat fall is more tardy with baths at 86° and below. Thermometric depression obtained by a bath at 93° F. lasting one hour is equivalent to the fall determined by a bath of thirty minutes at 71° F. (*b*)

[5] These are the conclusions formulated by Dumontpallier:

1. The refrigerant method in typhoid fever cannot be judged, except by experimental and scientific researches.

2. This method carefully conducted, not exclusive of other treatment, may offer great advantages in therapeutics.

3. It cannot make pretentions to the cure of all patients affected with typhoid fever, but in modifying the hyperthermia and its consequences, it may diminish the mortality in a notable proportion. (*c*)

[6] Currie employed affusions of cold or of tepid water. These affusions consisted in throwing over the patient a certain quantity of cold water; then he bathed him with vinegar and water and afterwards with sea-water. He preferred in general for these affusions, sea-water to river-water. He made use also of affusions of tepid water, that is to say, of water from 87° to 95° F.

Wanner employed sponge lotions which he called *passes;* this sponging was repeated several times a day. (*d*)

(*a*) Riess, Ueber den Einfluss des parmanenten Cauwarmen Bades auf die Temperatur des Typhus (Centralbl., No. 30, 1880).—Afanowjew, Ueber die Behanlung von Typhus Krankenmit Langdauernden lauen Bädern (Saint-Petersbourg Med. Woch., No. 26, 1881.)

(*b*) Théry, Physiological study on prolonged baths. These de Paris, 1881.

(*c*) Dumontpallier, contribution to the study of the refrigeration of the human body in febrile diseases and in particular in typhoid fever. [Acad. des sc., Feb. 26, 1883.]

(*d*) Currie, Medical Reports of Cold Water, etc., Edinburgh, 1797.

failed to observe; the temperature falls appreciably under their use, especially if they are repeated several times a day. This heat-reducing power is, I well know, limited, and in certain grave cases of ileo-typhus these lotions do not suffice to bring down the temperature, and we must have recourse to more active means. I believe the refrigerant action of these lotions to be a secondary effect, the principal and dominant action being that which they exert on the vaso-motor functions of the cutaneous capillary network, functions so profoundly disturbed in typhoid fever, and which tend to become restored under the influence of these cold lavations or spongings.

This vaso-motor and revulsive action is much more energetic when the wet pack is used.[1] The method is very simple; the patient, in a state of nudity, is wrapped from head to foot in a sheet or blanket wrung out of ice-cold water. It is well, as a preliminary step, to have a rubber blanket spread upon a mattress; over this you place the wet sheet, in which you wrap your patient. Liebermeister advises that this envelopment should be continued for ten minutes; for my part, I prefer a shorter duration of a minute or so, after which the patient is taken from the wet sheet and removed to his bed. If I prefer wet wrappings of short duration, to the practice of Liebermeister, it is because I do not wish to obtain refrigeration from these envelopments, but only a regulative modification of the nervous system, and this effect will be the more marked, the shorter the duration of the cold application. This is, gentlemen, one of our most powerful modes of treatment in cases of typhoid fever of ataxic and adynamic character, and you will derive great benefit from it. Foltz has recently added cold lavements to the refrigerant medication.[2] These lavements of water at 50° F., lower the temperature of patients—in a feeble manner it is true—but still appreciably, and this is a fact worthy of being remembered. So wherever you have occasion to give enemata to typhoid patients, see to it that the water which you use is cold.

[1] Priesnitz, Scoutétten, and Liebermeister have studied the action of wet wrappings in fevers. This envelopment is made in two ways; in the one the patient, being naked, is wrapped in a blanket wrung out of cold water; the application does not last longer than a minute, then the patient is rubbed dry and put into bed,

Liebermeister employs another method; it consists in leaving the individual wrapped in a wet sheet and covered with a woolen blanket for ten minutes, and in renewing this wet pack three or four times in succession.

According to Liebermeister, four successive wet wrappings thus practiced produce the same effect as that of a bath at 68° F. lasting ten minutes. Ziemssen and Zimmermann have not obtained from this wet pack so notable a refrigerant action; it is true that they do not prolong the duration of the wrappings so long. (*a*)

[2] Foltz, of Lyons, has treated 27 patients by cold lavements, and has administered to each of them a number of lavements which has varied between 30 and 300. Out of these 27 patients only one has succumbed. The quantity of water varies with the age, from eight ounces to a quart; the temperature of the water was between 50° and 60° F.

Brand has observed that cold lavements lower the temperature from 0°.2 to 0°.5; but this fall does not last long. Prosper Boyer, basing himself on the results obtained by Barrallier, of Toulon, affirms that cold lavements are superior from the point of view of the refrigerant medication, to cold baths. (*b*)

(*a*) Liebermeister, Handbuch der Pathology und Therapie des Fiebers, Leipzig, 1875.—Scoutetten, Rapport sur l'hydrothérapie, adressé à M. le Maréchal ministre de la guerre, après un voyage fait en Allemagne, Strasbourg et paris, 1843; De l'eau sur le rapport hygiénique et médical de l'hydrothérapie, Paris, 1843, in-8°.

(*b*) Boyer, Comparative utility of cold baths and cold lavements in the treatment of typhoid fever. (Thèse de Paris, No. 234, 1875.)—Foltz, on cold lavements in the treatment of typhoid fever. [Lyons Medical Journal, 1875.]

Having finished refrigerants, I pass now, in accordance with the order which I adopted in the previous lecture, to bloodletting.[1]

Very much in use in the treatment of fevers at the commencement of this century, and before we had precise notions respecting the nature of typhoid fever, bloodletting was still practiced at a later date in this disease by Louis and Chomel, and especially by Bouillaud, who thought to jugulate the disease by applying to it the formula of "bleeding upon bleeding" (*coup sur coup*). Today the practice of bloodletting, local or general, is completely abandoned; and, nevertheless, whenever nature herself proceeds to the letting of blood, and when these losses do not exceed certain limits, we see the temperature fall, and symptoms of the greatest gravity abate; so that, in a great many cases, intestinal hemorrhages are an element of prognosis rather favorable than otherwise. The two clinical charts which I here show you, indicate well the antithermic action of these hemorrhages.[2] It is true that you sometimes purchase this amelioration by a long and painful convalescence; however this may be,

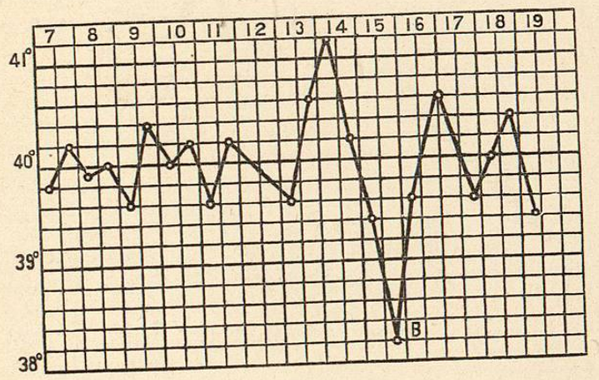

FIG. 15.

[1] Louis and Chomel recommended moderate bloodletting in typhoid fever. Bouillaud practiced bleeding *coup sur coup* (repeated bleeding), from the first week of the disease, thinking to cut short the disease; after the second week he abandoned bloodletting and gave a tonic règime. Forget, although a partisan of bloodletting, only practiced it in certain forms of typhoid fever called inflammatory.

[2] In the first curve (fig. 15) we have represented the pyrexial progress in a patient twenty-three years old, and vigorous, who on the fourteenth day of the disease was taken with a very abundant intestinal hemorrhage (B.) which caused his temperature to fall from 41° to 38° C. The first depression during the eleventh and twelfth days corresponds to the administration of salicylic acid.

we note the fact without venturing to authorize the interference of the physician in order to produce artificially, in typhoid patients, loss of blood.

I now come to the study of medicaments which act on the fever by the intermediation of the nervous system, and we shall examine successively the treatment of typhoid fever by digitalis; aconite, veratrum viride and sulphate of quinine.

It is Hirtz who, in our country, has defended with the most ardor the treatment of this fever with digitalis, a practice already adopted since 1862 by Wunderlich.[1] Digitalis is given in the form of infusion, and fifteen to thirty grains of the powdered leaves are steeped in a gill of water, all of which is administered daily in divided doses. These doses, continued for three days, cause a notable diminution of the pulse and temperature, but despite this

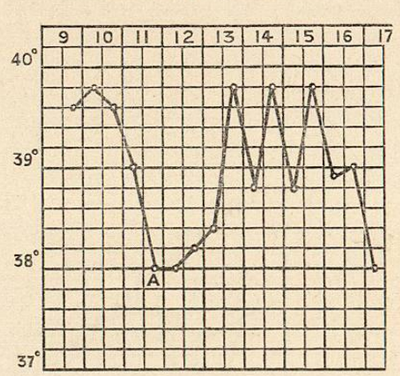

FIG. 16.

The second curve (fig. 16) corresponds to a case of typhoid fever in a young man of nineteen; the tenth day of the disease supervened a very abundant hemorrhage. The next morning (A.) the two patients were better, but their convalescence was long and painful, marked by very pronounced thermic oscillations.

[1] Wunderlick, in 1862, counseled the use of digitalis in typhoid fever; he recommended its administration in the form of infusion, advising to steep from fifteen to thirty grains of the powdered leaves in six ounces of water, and give the whole daily in divided doses. Under its use he asserted that the pulse and temperature went down.

Fritz was one of the most ardent advocates in this country of the treatment of fever by digitalis. In 1869 he reported the results of this medication, which were strongly commendatory. His method was as follows: from ten to fifteen grains of digitalis leaves was infused in four ounces of water, of which a tablespoonful was given every hour; this treatment was continued for three days.

Bernheim has observed during this treatment a lowering of the temperature down to even 96° F. The pulse and temperature fell at the same time.

Grimshaw employs digitalis in typhoid fever; according to him this medicament diminishes neither the duration of the fever nor the temperature; it only diminishes a little the frequency of the pulse and augments the force of the heart's contractions.

German Sée is opposed to the administration of digitalis in typhoid fever; he thinks

powerful antithermic effect, which is not denied by any observer, this kind of treatment is not much in favor. One fears, with reason, the action of digitalis on the heart, which is so often affected, as we have seen, with symptomatic myositis, as well as the emeto-cathartic effects which digitalis determines when given in such large doses.

I shall not take up your time with the treatment by aconite[2] recommended by Lavasseur and Deshayes, of Rouen, nor with that of veratrum viride employed by Hirtz, Vogt, and Liebermeister,[3] their trials not having been since repeated; at the same time remarking, *apropos* of the first of these medicines, that if you wish to experiment with aconite you should use the tincture of the root and not that of the leaves, the latter having no medicinal virtue, and I pass now to the study of a kind of treatment which has numerous partisans at home as well as abroad. I refer to the medication of typhoid fever by quinine.

Broqua, of Mirande, in 1840, communicated to the Academy of Medicine the good results which he had obtained in the treatment of typhoid fever with large doses of sulphate of quinine,[4] and we have seen successively Chappotain,

that to lower the temperature it is necessary to employ daily doses of more than 30 grains, and that these doses may be the cause of grave accidents, especially when the heart is affected with granulo-fatty degeneration.(*a*)

[2] In 1863 Lavasseur, and in 1873 Deshayes employed tincture of aconite in the Hôtel Dieu of Rouen in the treatment of typhoid fever. This is the formula which Deshayes employs:

℞ Alcoholic tinct. of aconite..... gtt. xx.
Distilled water..... ℥ iv.
Tinct. aurant. cort..... q. s.

M. S. A dessert spoonful every two hours.

He feeds his patients with beef tea or veal broth (a cupful every two hours). (*b*)

[3] Vogt has given veratrum in large doses in typhoid fever. Liebermeister prescribes pills of one-twelfth of a grain of veratrine every hour till nausea and vomiting follow. From four to six pills suffice. This treatment produces considerable prostration. (*c*)

[4] Sulphate of quinine was introduced into the therapeutics of typhoid fever by Broqua, of Mirande, in 1840. Chappotain, of St. Laurent, applied the method of Broqua at the Hôtel Dieu, in 1842. Pereira in his théses made known the results of this method. Boucher of the Ville Jossy, in his inaugural théses, insists on the utility of employing large doses, 30 grains at least. Monneret goes farther and proposes to substitute for the miasmatic poisoning of typhoid fever, the toxic action of sulphate of quinine, hence he would give as much as 75 grains a day to a typhoid patient. Blache and Briquet report the good effects of this treatment in the case of children.

These tentatives were repeated in Germany by Vogt in 1858, by Wachsmutt in 1863, particularly by Liebermeister in 1867. The latter has insisted on the doses and the period of administering them. He gives from 30 to 45 grains a day in divided doses of seven or

(*a*) Wunderlich, Arch. der Heilkunde, 3e Heft, ams. 1869.—Hirtz, Des indications de la digitale dans la fièvre typhoide (Bull. de thér., t. LXXVII, 1869, p. 223).—Grimshaw, On the influence of Digitalis on the weath heart of Typhus fever (the Dubl. Journ. of Med. Sc., juin).—Germain Sée, Clinique de l'Hôtel-Dieu, leçon sur le Traitement de la fièvre typhoide (France méd., 1878 et 1879, et Mouv. méd., 1874).

(*b*) Deshayes, On the treatment of typhoid fever by aconite. (Gaz. hebd., 1875).

(*c*) Liebermeister in Ziemssen's Anthology.—Louis Boiteux, on Typhoid Fever. (Thèses de Paris, 1883, p. 119).

of St. Laurent, Pereira, Boucher, of Ville Jossy, Blache, Briquet, and Monneret boast of the effects of this medication. Monneret went the farthest in this direction, for endeavoring to substitute for poisoning by the typhogenous miasm the toxic effect of quinine, he was in the habit of administering as much as seventy-five grains a day of this medicine. Such bold experiments were sometimes followed by bad results; therefore this medication was abandoned, at

eight grains every ten minutes; he begins the administration of these doses about five o'clock in the afternoon. He obtains thus a reduction in the pulse and temperature, which persists from twelve to eighteen hours; he waits several days before repeating this dose. Liebermeister employs indiscriminately cold baths or quinine, but he prefers the latter medication.

Kaulich and Chapetal, of Vienna, employ Liebermeister's method in the typhoid fever of children, and they apply concurrently the refrigerant method and sulphate of quinine, which they associate in the following way: every day in the first part of the afternoon the child is wrapped in a sheet wrung out of cold water, then is given, in one full dose, seven and one-half to thirty grains of quinine (the child being supposed to be from four to ten years of age). This mode of treatment is repeated every second day in cases of urgency; moreover, a careful alimentation is early commenced.

Lindwurm, of Munich, never exceeds 30 grains a day. Lassau, of Copenhagen, gives the same dose all at once from seven o'clock till nine o'clock in the evening. Hérard also employs sulphate of quinine, and goes as high as 45 grains a day.

Germain Sée uses sulphate of quinine and prefers it to all other antipyretics; basing himself on some experiments made with Bochfontaine; he, in fact considers sulphate of quinine as a heart tonic; he gives it in one large dose about seven o'clock in the morning.

Jaccoud also prefers quinine to salicylic acid. He gives the first day 30 grains of bromhydrate of quinine; the second day 20 grains and the third day 15 grains. The medicament is taken in substance in wafers, each containing 7½ grains; the wafers are swallowed one after the other, with ten minutes of interval. Jaccoud administers them in the morning when he wishes to lower the evening temperature, and in the evening when he wishes to lower the morning temperature, and with respect to this administration he regulates himself according to the examination of the temperature of the patient.

Pawer employes doses much smaller, and never gives more than seven or eight grains a day.

Teisser has shown the danger of sulphate of quinine in large doses. According to him it is an hyposthenic medicament which certainly enfeebles the functions of the nervous system.

Laborde, in basing himself upon his experimentation, has shown that the massive doses of sulphate of quinine may determine in certain cases of infectious myocarditis grave accidents on the part of the heart. Dujardin-Beaumetz has also shown the danger of these large doses of sulphate of quinine. (*a*)

(*a*)Broqua (de Mirande), Acad. de méd., 1840.—Chappotain de Saint Laurent, Arch. de méd., septembre 1842, t. XV, 3e série, p. 5.—Pereira, Recherches cliniques sur l'emploi du sulfate de quinine à haute dose dans le traitement de la fiévre typhoïde (thèse de Paris, 1842).—Boucher de la Ville-Jossy, Quelques réflexions sur l'action physiologique du sulfate de quinine à haute dose en général, et, en particulier, dans le traitement de la fièvre typhoïde (thèse de Paris, No. 22, 1846).—Monneret, article Fièvre Typhoïde, Compendium, t. VIII, p. 258.—Blachez et Briquet, Un méd., 3 novembre 1853.—Liebermeister, Recherches physiologiques du sulfate de quinine sur l'homme sain (Arch. Schm., 5 vol., CXVI, p. 275).—Oeffner, Die Anwendung des chinis bei der Behandlung der Typhus, Munich, 1874.—Germain Sée., Leçons de clinique faites à l'hôpital de la Charité (Mouv. méd., 1874, et Acad. de méd., 1883.)—Oehme, Zur Anwendungsweise des chimins in Typhus abdominalis (Zeitsch. f. Prak. Med., Nos. 42 et 43, 1875).—Jaccoud, Traitement de la fièvre typhoïde, leçons à la Faculté, 28 et 30 novembre 1881, et Acad. de méd., 1883.—Dujardin-Beaumetz, Acad. de méd., 1882 et 1883.—Laborde, voir Jules Simon, Des succédanés en thérapeutique (thèse de Paris, 1882).—Pawer, Large doses of quinine in enteric fever (the Med. Times and Gaz., 1er février 1873).—Kaulish, Therapeutische Beobachtungen heim Typhus abdominalis (Jahrbr. f. Kenderh., Bd. XVII, Heft 1, série 1re, 1881).

least in our country. Vogt, in 1858, and Wachsmuth, in 1863, and, lastly, Liebermeister, in 1867, repeated these first trials, but this time they applied to the study of the effects of the medicament the use of the thermometer, and gave precise indications of the administration of the medicine. This treatment was rapidly adopted in foreign lands and in France, and we see Lindwurm, of Munich, Œffner, Larsen, of Copenhagen, Pawer, Kaulich, Jaccoud, Germain Sée, Herard, Barthez, and others, put in practice this medication.

It is the sulphate of quinine that is most often employed; yet in Germany use is made of the hydrochlorate, and in France Jaccoud prescribes the bibromhydrate of quinine. These salts are administered in solution, or oftener in capsules; the pill form should be discarded, for it not seldom happens that on account of the state of the digestive tube, these pills pass through the intestinal canal unaltered. But the capital point, and it is this on which Liebermeister has insisted, is to give large doses; for example, you should make your patient take eight grains every fifteen minutes till half a drachm has been reached. Liebermeister often exceeds this quantity, and continues giving the small doses every quarter of an hour till from forty to sixty grains are administered, but in this country we generally stop at half a drachm.

The period of administration of these massive doses has also a great importance. Liebermeister counsels to give the quinine between five and seven o'clock in the evening; Germain Sée prefers the morning; Jaccoud, with good reason, says that you should give it in the morning or evening, according to the effect which you desire to obtain. Do you wish, for instance, to procure a lowering of the evening temperature? give your quinine in the morning; Do you wish to obtain a matinal fall? give it in the evening. Liebermeister and Kaulich give one large full dose on one day only, and do not repeat the dose unless the temperature takes on again an ascending march. Jaccoud gives his salt of quinine in decreasing doses for three days. Sée administers it without interruption. I believe that the method by interruption has great advantages over the continuous employ of the medicament, and you ought to be guided in this regard by the thermometric curve.

Employed after this fashion, sulphate of quinine produces in typhoid patients a very pronounced depression of the pulse and temperature, which lasts often for two days, and when the thermal curve rises it does not attain as high a point as before the exhibition of the quinine. But this antipyretic action, obtained with such large doses of quinine, has certain advantages. In giving to the patient thirty, and often forty or more grains of quinine, you are likely to overstep the therapeutic effect, and obtain the toxic action on the brain and on the heart. Gérmain Sée and Bochefontaine affirm that this cardiac action is of a tonic kind, but Laborde, with much reason, maintains that it is dangerous in hearts with degenerated muscular fibre, and you know that the latter is a very common complication in the infectious diseases.[1] More-

[1] Germain Sée and Bochefontaine have noticed by experiments on animals and by direct tracings on the healthy man and in the febricitant, that sulphate of quinine supports the heart's force and even augments it; it especially causes disappearance of the dicrotism

over (and this is an argument which I adduced in the last discussion at the Academy), the typhoid patient is a bad subject for treatment, not only because absorption of medicines is difficult in consequence of the unhealthy state of the digestive tube and the lymphatic vessels, which originate there, but also because the functions of the kidney and the liver are notably compromised. In a former course of lectures I showed you the capital importance of the liver and of the kidney from the point of view of the action of medicines, and from all these considerations you see how easy it is, when drugging your typhoid patients, to exceed the therapeutic and obtain the toxic action of your remedial agents.

You ought always, gentlemen, to have these facts in mind when prescribing active medicines in large doses to your patients in this fever. And while recognizing the benefits of quinine medication, I believe that it is best to be very prudent in the administration of this alkaloid, and never to exceed the dose of thirty grains a day, and always to have care not to give this medicament continuously. Therefore, I much prefer, as an antipyretic, salicylic acid to quinine, because one obtains antithermic effects quite as powerful with the former, and in doses which entail less danger.

It was Riess who first, in 1875, applied salicylic acid to the treatment of typhoid fever; and since this first trial, Schroeder, Nathan, Fischer, Ewald, Goldtammer, Bælz, in foreign lands, and in France, Garcin, Noel Gueneau de Mussy, Jaccoud, Oulmont, Hallopeau, Caussidon, and Rabeau, and, especially, Prof. Vulpian, have shown us the advantages which may be derived from salicylic acid in this disease. Salicylate of soda, salicylate of bismuth, and salicylic acid have severally been employed.[2] Salicylate of soda is preferred by the

which results, according to them, from direct diminution of the blood pressure, and moreover from relaxation of the walls of the vessels due to intensity of the fever.

Laborde, on the contrary, while recognizing the action of quinine on the heart shows that in animals massive doses determine ataxia of the heart; an ataxia which leads to the complete exhaustion and cessation of the efficacious contractions of the heart. (*a*)

[2] Buss was the first, in 1874, to employ, at the Cantonal hospital of Saint Gall, salicylic acid in the treatment of typhoid fever. He gave it in powder, in the wafer form, or in emulsion in water. He declares that salicylic acid given in doses double that of quinine, has the same antipyretic efficacy as the latter.

The year following, in 1875, Riess treated 250 cases of typhoid fever by salicylic acid. He gave from 75 to 100 grains of salicylic acid a day, and he administered it in solution with bicarbonate of soda. He observed by this means a notable diminution in the pulse and temperature.

Schroeder has also employed salicylic acid, or rather its solution, in alkaline menstrua, and prefers the salicylate medication to the cold bath treatment. Nathan, of Kiel, in 1875 recommended much larger doses, giving as much as 180 grains of salicylate of soda a day. Fischer prefers salicylic acid, which he administers in substance in wafer form. He gives massive doses of from 30 to 120 grains morning and evening.

Liebermeister has also employed salicylic acid; he prefers the salicylate of soda, and remarks that its antipyretic effect is more noticeable than that of quinine. Ewald also prefers salicylate of soda. According to him the minimum dose necessary to lower the temperature should be 75 grains. Riegel, of Cologne, also gives the acid dissolved in water by means of the salts of soda; he pretends thus to avoid the irritation of the digestive tube. Goldtammer vaunts the effects of salicylic acid, he also prefers the salicylate; small doses at intervals, according to him, produce no effect, but a massive dose of 75 grains given in the evening determines a fall in the temperature of more than three degrees.

Bælz gives from 60 to 90 grains of salicylate of soda once or twice a day; he has observed under this treatment a fall of 6°, and even 6°.5 without any concomitant dangerous phenomenon; he has also noted that the temperature when it goes up again, attains a less height than before the administration of the salicylate. He has not noted any degree of excitation till after doses of 60 grains; this excitation is more intense in women than in men. He has also observed an augmentation in the quantity of urine and the appearance in the latter of salicylic acid eight minutes after the administration of this medicament in a patient affected with exstrophy of the bladder. Albert Robin has, on the contrary, noticed a diminution of the quantity of urine, and a very marked augmentation in its density, which may attain 1044 under the influence of 90 to 120 grains of salicylic acid.

(*a*) Germain-Sée et Bochefontaine, Comp. rend. de l'Acad. des sc., 1883, et Gaz. méd. de Paris, 3 février 1883, p. 52.—Laborde; voir Jules Simon, Des succédanés en thérapeutique (thèse de Paris, 1883, p. 39).

greater part of German physicians, as producing less irritation of the alimentary canal than salicylic acid, and as being quite as good an antipyretic. I do not hold this opinion, and believe with Prof. Vulpian, supported as is this belief by numerous cases occurring in my hospital practice, that salicylic acid possesses —in equal dose—an antifebrile action far superior to that of salicylate of soda; and I am as much a partisan of salicylic acid in the treatment of this fever as I am of the salicylates when it is a question of rheumatic fever. Salicylate of bismuth, which I was the first, I believe, to employ in therapeutics (not, indeed, in typhoid fever, but to combat the fetid diarrhœa of infancy), has been utilized by Vulpian in the treatment of dothinenteritis. Guided by the idea—very just,

In France the employ of salicylic acid in typhoid fever dates from 1875. At this epoch, Garcin, of Marseilles, administered salicylic acid in the dose of seven to 15 grains, this is the same dose that Noel Gueneau de Mussy gives; the latter employs from 15 to 30 grains of salicylic acid, dissolved in one or two ounces of gum arabic water, sweetened with syrup; from one to four teaspoonfuls of brandy are added.

In 1876 Jaccoud also made trial of salicylic acid; he made use of capsules containing eight grains of salicylic acid and gave 30 grains the first day, 20 the second, 15 the third; he now prefers sulphate of quinine to salicylic acid.

Hallopeau employs, in their order, salicylate of soda, sulphate of quinine and calomel; this is how he proceeds in his medication: the first day of their entry the patients take 15 grains, or a scruple of calomel; the days following he gives them either salicylate of soda in one dose only of 30 grains, or sulphate of quinine in the dose of 15 or 20 grains; then he continues alternately these two medicaments, having care not to leave his patients subjected more than three consecutive days to the action of the salicylates. He prescribes simultaneously cold lotions renewed from three to five times a day, cold applications over the abdomen and cold lavements. In the ataxic forms, he has recourse to digitalis simultaneously with cold baths; the visceral congestions are combatted besides by repeated applications of dry cups. He endeavors to sustain, as far as possible, the forces of the patient by making him take every two hours a cup of milk or of broth; the typhic patients thus ingest regularly four or five quarts of milk a day. Apart from the calomel given the first day, M. Hallopeau makes little use of purgatives, which have the inconvenience of hindering the administration of the antipyretics, and whose utility appears problematical in a disease where diarrhœa is almost constant.

Vulpian is a great advocate of the employ of salicylic acid, which he prefers to the salicylate of soda, and the results of his practice have been published in the thesis of Henri Rabeau. He administers the salicylic acid in the quantity of 75 to 100 grains a day, in powders of 7½ grains an hour. The defervescence produced by this medicament follows a con-