

Through the courtesy of Parke, Davis & Co., of Detroit, Mich., and of S. B. Penick & Co., of New York City, I received leafy branches with the well-developed buds of this latter kind. I identified these as the Carolina Poplar or Cottonwood, *Populus balsamifera* Linn; but to make doubly sure the specimens were sent to Dr. C. S. Sargent of the Arnold Arboretum who confirmed my identification. We therefore have Balsam Poplar buds derived from *P. Tacamahacca* Mill., *P. candidans* Ait., and *P. balsamifera* Linn. True *P. balsamifera* Linn is one of the cottonwoods that has been generally included in *P. deltoidea* Marsh while the name has been misapplied to the northern Balsam Poplar, the proper name for which is *P. Tacamahacca* Mill. *P. angulata* Mx. f. is a synonym of *P. balsamifera* Linn and has sometimes been used to designate the species when given recognition. It is also probable that the common or Virginia Cottonwood, *P. balsamifera* var. *Virginiana* (Castig.) C. S. Sarg. (*P. deltoidea*, Marsh.), is a source of the Balsam Poplar buds. I have seen nothing on the market that might be classed as having been derived from *P. nigra* Linn. The proper time to collect these buds is in the spring when the trees are in full bloom and before the leaf buds have broken, so as to avoid gathering flowering buds, which could scarcely be helped if collected at any other time, the buds being developed sufficiently for gathering.

DEPARTMENT OF BOTANY,
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MALARIA PREVENTION AND CONTROL.

BY E. H. GANE, PH.C.

Malaria is one of the most widespread and destructive of all diseases affecting mankind. In some form or other it is prevalent all over the world and in some countries is responsible for an enormous number of deaths. In India, for example, malaria is responsible for over 100,000,000 cases of illness and an average of 1,130,000 deaths per year. In our own country it is very prevalent, more so perhaps than is generally imagined, all along the low-lying lands of the Mississippi and Missouri rivers and, in fact, in all those states which contain many rivers and marshes. There is, perhaps, no more important problem than the control and eradication of malaria in many sections of the United States. Not only does it affect the health of the people and cause many deaths, but it reduces the value of the land and, to a very large extent, the earning value of large numbers of patients who are affected with the disease but not to such an extent as to incapacitate them for light work. Many persons are infected without knowing it and the diminution in the efficiency of these people is a serious economic loss in many parts of the country.

Malarial fever, which is called by various names, such as Chills and Fever, Ague, Swamp Fever, Spring Fever, Congestive Chills, etc., is caused in only one way. Many people, including some physicians, are under the impression that it may be caused by drinking bad water, eating indigestible food or inhaling the night air. This is not so; malaria is always caused by infection and this infection is only brought about in one way, and that is, by the bite of the *Anopheles* female mosquito. The male mosquito does not bite. These facts have been experimentally proved over and over again by English, Italian and American investigators. Their

investigations have shown that the malarial parasite develops in the body of the mosquito and the young parasites find their way into the gland of the mosquito, whence it is injected into the human body when the mosquito bites. The young parasites take up their living in the red blood cells. These grow in size and in the course of 48 to 72 hours develop a number of young parasites by cell division, during which process the red blood cell is almost completely destroyed. The cell then bursts, setting free the young parasites and where a large number of these are set free at one time the result is to produce a well-known chill characteristic of the disease. It is easily seen that where large numbers of the blood cells are destroyed in this way, persons who are badly infected will soon become anemic from loss of red blood cells. The severity of an attack of malaria thus naturally depends on the extent of the infection. If the number of parasites is very large, with resulting production of a large amount of poison or toxin, severe illness or even death may result. If the number is very small the patient may feel languid and weak or he may not feel ill at all. It is these latter cases which are dangerous in any community because they are malaria carriers and transmit the disease to other people through the agency of the mosquito.

Some exceedingly important work has been done in the state of Mississippi during the past five years with the object of finding out if some standard treatment which would be applicable in all malarial cases could not be discovered. The International Health Board took up the problem with the department of Experimental Medicine at Tulane University working in conjunction with the Mississippi State Board of Health, Mississippi being one of the states suffering most from malarial infection. It was decided at the outset to do intensive work in one county, where it was known that a large amount of malarial fever exists. Bolivar County, Mississippi, was selected, having an area of 328 square miles and a malarial survey was made on 31,459 persons and those found to have malaria were furnished Quinine Treatment free by the International Health Board and the State Board of Health. The results of this survey proved that quinine is a specific in malaria when administered in the proper dose and for an adequate period of time.

Quinine, of course, has long been the standard remedy for malaria but results reported from all over the world were very divergent. The treatment with quinine in some instances seemed only to have a temporary effect, relapse being frequent and other drugs such as arsenic being added with a view to securing complete freedom from the infection. It is exactly one hundred years since quinine was discovered but it would seem that only during this malarial survey in Mississippi had any investigator thought it worth while to make any study of the dosage of quinine and the period during which it should be administered.

The large number of cases treated in Mississippi enabled very accurate studies to be made of the dosage for persons of all ages, and the results have been embodied in several reports from the Tulane School of Medicine.

The different salts of quinine have all been tried out and also various methods of administering with the result that the sulphate is found to be as effective as any other salt and more effective than some. The high solubility of some of the salts such as the bi-hydrochloride or chlorhydro-sulphate may in some cases be a disadvantage. Further, the drug is just as effective when administered by the

mouth and much more readily taken in this way. The reports have stated that those physicians who are inclined to give quinine hypodermically should take a few doses themselves. Administering hypodermically is painful and unnecessary. In no case is it necessary to give more than 10 grains at a time, and results have shown that the treatment given below will cure 90 percent of all cases. In only a very few cases is it necessary to continue the treatment for a longer period; some patients being an exception in some way and requiring longer treatment. The treatment worked out in this way is now known as the STANDARD TREATMENT for MALARIA and this treatment is recommended by the National Malaria Committee and also approved by the U. S. Public Health Service which has been cooperating with the local Boards of Health in several of our southern states.

The STANDARD TREATMENT for MALARIA is as follows:

For the acute attack 10 grains of Quinine Sulphate three times a day for three or four days. This controls the immediate acute symptoms. This is to be followed by 10-grain doses per day, given for a period of eight weeks. This is the dose for adults. The proportionate dose for children under one (1) year is $\frac{1}{2}$ grain; 1 year—1 grain; 2 years—2 grains; 3 and 4 years—3 grains; 5, 6 and 7 years—4 grains; 8, 9 and 10 years—6 grains; 11, 12, 13 and 14 years—8 grains; and 15 years or older 10 grains.

The failure of Quinine Treatment in many cases previously was due simply to the fact that the patient did not take the right dose or take it for a sufficient length of time. The heroic doses which are sometimes given are not necessary and may cause trouble. The important point to remember is to take or administer the quinine regularly for a given length of time. Intermittent treatment may cause a relapse, and then the full treatment has to be repeated and continued longer than eight weeks, no credit being allowed for previous treatment in the event of a relapse. In many instances a blood examination is the only way in which a person can definitely learn whether or not he is infected and therefore, in malaria infested parts of the country, it is always wise to make a blood examination of any person presenting any of the symptoms without any of the acute indications of the disorder. If all people who have contracted malaria would disinfect their blood by taking quinine continuously for eight weeks this one thing alone would enormously reduce the disease each year.

It is interesting to note that in Mississippi alone during the past six years or since this intensive malarial work has been carried on malaria has decreased to a marked extent. In 1915 there were 153,707 cases of malaria reported by the physicians of the state with 1,492 deaths; in 1920 there were only 18,376 cases and 653 deaths. There is, therefore, no reason why people should be infected with the disease if proper precautions are taken. The precautions are two in number.

1st—Avoid the bite of the mosquito, especially at night.

2nd—If infected take the Standard Treatment for eight weeks to thoroughly sterilize the blood or, in other words, to destroy the parasites in the blood by the use of quinine.

In some of the southern plantations from one-third to three-fourths of the people employed are estimated to have an attack of malaria every year. In the case of one plantation with 600 tenants the annual doctor's bill was \$4,000, of which \$3,000 was due to malarial disease. An examination was made and all persons

who had had malaria and who were carrying parasites were given the Standard Treatment. The result was to diminish the malarial cases by approximately 80 percent. In one town in Arkansas in three years' time 97 percent of the malaria had been eliminated by proper control movement. It is obvious that mosquito control is also highly necessary if malaria is to be completely banished. If there are no mosquitoes there will be no malaria and consequently anything that reduces the number of mosquitoes tends to reduce the prevalence of malaria. Persons who have malaria should be protected by a proper screening from mosquito bites, so as to avoid infecting mosquitoes which may transmit the disease to others. Control of mosquitoes is, naturally, a more difficult problem than that of sterilizing the malarial patient, but much can be done at little outlay to diminish the number of places where mosquitoes breed.

As a result of all the work that has been done the U. S. Public Health Service is taking steps to extend this Standard Treatment to all sections of the country where malaria is prevalent. Work has been started in the states of Georgia, Louisiana, Alabama, Mississippi, Tennessee, Arkansas, Texas, Missouri, S. Carolina and Virginia. Physicians and druggists are being asked to coöperate in this movement which is the first attempt which has been made on a very large scale to bring about a real control of this insidious disease.

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THE MANUFACTURE OF ANHYDROUS AND HYDROUS WOOL FAT.*

BY K. F. EHMANN.

Wool fat, as the name implies, is obtained from the wool of the sheep. The fat is removed by scouring or washing the wool. The fat at this stage is known as "swint," which is an admixture of hair, dirt and soap; the color varies from a light yellow to a very dark brown, having a very disagreeable animal odor.

The swint is now placed in a steam-jacketed kettle, fitted with a suitable mechanical stirrer; cold water is run in until the kettle contains equal parts of water and crude fat, and two percent of sulphuric acid. The mixture is now stirred for at least one hour, at the end of which time steam is applied and the mixture heated to just below 100° C. Care must now be exercised, for if the fat is overheated, it will seriously interfere with the separation of the two layers, water and fat. This procedure must be continued until the wash-waters are perfectly clear and do not have an acid reaction with litmus.

At this point of the purification a sample of the crude fat is taken and tested for acidity, alkalinity of ash and iodine value. From the results it is ascertained what treatment the crude fat requires. If the fat shows a high acidity, it will then have to be treated with sodium carbonate. The use of the stronger alkalies, such as potassium or sodium hydroxide, must be avoided; they have a tendency to form a strong emulsion, which is very difficult to break. If such a condition should occur, as often it does even with the use of sodium carbonate, the process of "salting out" must be resorted to. After this, the alkaline solution should be washed out

* Read before Section on Practical Pharmacy and Dispensing, A. Ph. A., New Orleans meeting, 1921.