quantity of water for this purpose, considerable of the advantage that otherwise would be gained by driving off water from the system will be lost. Each Oficina should have its own solution as to which method will give the cheapest cost and the best results.

In the above brief discussion only those methods have been mentioned which have been tried on an actual operating scale. There are a number of other possible means, but the ones described are those which at the present time are giving satisfactory results in the few Oficinas that so far have appreciated the opportunity that they have for the manufacture of a valuable by-product. A number of the larger companies are giving serious study and consideration to this new development of the nitrate industry and a year undoubtedly will see a number of other Oficinas producing potash.

UTILIZATION OF THE SHARK FOR FOOD AND LEATHER¹

By Allen Rogers

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From time immemorial the shark has been considered as an enemy to man and as a scavenger of the sea. He has been pictured as the cannibal of the deep, and in fiction has been painted as the monster who lurks about the ill-fated ship in order to devour the unfortunates who may have met their death in the gale or on the reef. We, therefore, for generations have cherished an antipathy for this creature of the sea and have been very willing to accept as fact all of these stories, never stopping to consider that perhaps after all the shark might have a few points in his favor.

To begin with, the shark does not live exclusively on the flesh of man. In fact, there are only a few species who would eat human flesh even if it were possible for them to secure it. The principal species considered a man eater, the tiger shark, probably has seldom had the pleasure of this delicacy. Sharks, like all other fish, live on the smaller fish; thus upholding the proverb that the big fish eat the little ones.

Sharks travel in schools or singly and are found most abundant where food fish are plentiful. They are especially fond of the mullet, menhaden, mackerel, and sea trout. Thus it will be seen that they are migratory and at various seasons are found in different waters. They are naturally warm water fish which accounts for the large number found in the Gulf of Mexico, along the coast of Florida, and the West Indies. Being rapid and powerful swimmers they often follow ships for hundreds of miles picking up food as it is thrown over the side of the vessel. Thus their diet at such times is not unlike that of our domestic hog and poultry. It is claimed by fisher folk that the shark will not eat unsound food, which shows him even more particular

¹ Presented before the Division of Agricultural and Food Chemistry at the 58th Meeting of the American Chemical Society, Philadelphia, Pa., September 4, 1919.

than our friend the porker. Why, then, if he is so clean in his habits of life should we discriminate against him?

The Bureau of Fisheries for several years has endeavored to interest the people of this country in using shark meat as an edible product, with a certain amount of success. In fact, that species of shark known as dog fish is being canned in large quantities and sold under the name of gray fish. Certain fisheries on the New England coast are removing the head, tail and fins and selling the product in Boston and New York as deep sea sword fish. In Boston also shark meat is being sold as such to the Italian trade who appreciate its food value and enjoy its delicate flavor. Why, then, should we not take a lesson from the Italians and acquire the sharkeating habit?

For the past five or six years the writer has been interested in developing a method for converting shark skins into a merchantable leather. As a result of this work several processes have been devised which have been assigned to the Ocean Leather Company operating fisheries at Morehead City, N. C., and Fort Myers, Fla. This concern alone expects to get up to a catch of 1000 fish daily, although at present they are not taking this number. The skins are now being manufactured into leather, the livers rendered for their oil, and the flesh converted into fertilizer stock. It is estimated also that at least 1000 sharks can be secured daily from the fishermen handling food fish, who at present simply kill the sharks getting into their nets and throw them back into the water. By this wasteful procedure on the part of the fishermen at least 1000 sharks daily are destroyed along the Atlantic coast. Thus not only is the skin lost to the leather trade, not only is the liver oil discarded, not only is a large amount of fertilizer material made unavailable, but at least 50 per cent of the weight of the shark which would be fit for human consumption goes to waste.

A conservative estimate based on the above figures indicates that for a catch of 2000 sharks daily, at an average weight of 200 lbs., there would be 400,000 lbs. of fish. As at least 50 per cent could be used for human consumption we would have 200,000 lbs. daily or 73,000,000 lbs. annually. Assuming that the market price could be set at 10 cents we have a saving of \$7,300,000.

The question of supply is one that is constantly being asked. From personal observations and those of men who are most familiar with the subject, it seems evident that the supply is inexhaustible. Another question is often raised as to the best method to prepare the flesh for market. The answer is, cold storage. This method, however, may not always be practical in isolated fishing stations; recourse must then be made to salting, smoking, or drying. The fresh meat, however, is the most delicious, and when boiled, broiled, or baked furnishes a white, flaky food closely resembling halibut or sword fish.

A source of food supply so extensive warrants our most careful consideration and it is hoped that the time is not far off when we may overcome our prejudice and take advantage of Nature's abundant supply.

NOTES AND CORRESPONDENCE

CHLORINE AND INFLUENZA¹

By Charles Baskerville

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The sharp contrast in the number of cases of influenza during the severe epidemic of 1918, observed at Edgewood Arsenal among the soldiers on duty in the chlorine plants to others in the Chemical Warfare Service on the reservation, prompted an investigation as to experience elsewhere. Colonel Walker suspected chlorine as the benign prophylactic and Major

¹ Presented in abstract at the 57th Meeting of the American Chemical Society, Buffalo, N. Y., April 7 to 11, 1919.

Vaughan supported it for the writer with a detailed report on the conditions which obtained at Edgewood. Information was then sought and secured from practically all chlorine producers in the United States and many users. No data were obtained from bleacheries (cloth) or water purification plants where chlorine was used. Cordial and frank responses came, with permission to use names in some instances. In case of others confidence was enjoined, hence with the single official reference cited, names and places are omitted in this report.

A digest of correspondence with some 25 producers of chlorine products indicates a very pronounced belief on the part of the

majority that the presence of small amounts of chlorine in the air has a decided prophylactic effect in the case of influenza, or that it at least tends to minimize the severity of attacks of the disease.

As a result of their experience, 13 concerns considered that employees working in parts of their plants where small amounts of chlorine were apt to be present in the air are much less apt to contract the disease than are other workers. In some instances where careful records were available, there was either an entire lack of infection, or, where there were any cases of the disease, they were very light and followed by complete recovery. Some of these latter cases could be traced to exposure to infection at home or away from the works. A few instances are cited as illustrative.

In one instance, a plant located in a town where the epidemic of 1918 is reported to have raged harder than in any other town in the United States, there were very few cases in the chlorine department as compared with the rest of the plant.

A plant, in which 15 per cent of its employees were infected, reported no cases in its chemical building where chlorine was produced, nor did any occur in its bleach room.

Out of a plant force of 60, at a hydro-electric factory, there were 3 cases, 2 being men who seldom worked where chlorine was present. Out of the office force at this same establishment, there were 4 cases out of 12 employees.

At one of the government arsenals where chlorine was produced, despite the prevalence of influenza on the reservation, only one man in the chlorine department contracted it, although on account of a shortage of nurses, chlorine operators were used in this capacity.

In one plant 75 per cent of the employees (150 out of 200) had influenza. Of these, however, only one died, and there were only two or three severe cases.

Of the 12 other concerns with whom correspondence was carried on, the majority either lacked records upon which an opinion could be based, or were undecided as to the effect of chlorine as a prophylactic for influenza. Many of them expressed the opinion that chlorine workers were noticeably free from colds and other pneumatic diseases.

In one instance a decidedly negative report was given. It was believed that rather than having any prophylactic effect, it instead created a decided predisposition towards the contraction of influenza. This plant employed 1,000, 65 being girls, all the latter attending electrolytic cells for the production of chlorine. Air in the cell room averaged 0.0009 chlorine. About once a year a complete bank of cells explodes, when the chlorine rises as high as 60.36. On such occasions escapes are used and repairs made by workmen wearing trench masks. At the height of the epidemic 297 men and 31 women had the "flu," but all recovered and showed no ill after-effects.

In another plant during the first epidemic, the workers were practically exempt, but during the second, the plant was nearly put out of business for a month on account of the number of employees down with the disease.

The data may be far too few to warrant drawing any conclusion, but these facts speak for themselves. The medical profession confesses inadequate knowledge as to the etiology of influenza (or whatever it may be called), and it would be presumptuous for chemists to state that extremely dilute chlorinated air is a general prophylactic, but a chemist may repeat the words of a distinguished past president of our SOCIETY to the medical man, "Try it." It can do no harm. We got modern inhalation anesthesia and gaseous disinfection from the pneumatic era at the close of the 18th Century, so perhaps in seeking to correct unmistakable injury due to our fumes and noxious vapors, we may find that they do good when properly regulated.

A BEQUEST TO THE AMERICAN CHEMICAL SOCIETY

An important communication has just reached the offices of THIS JOURNAL concerning a bequest recently made to the AMERICAN CHEMICAL SOCIETY by a prominent citizen. On request no names are mentioned in connection with the matter, but the following extract from the will is printed, not only as a matter of interest to all members of the SOCIETY, but in the hope that the example thus set may be the forerunner of many similar bequests whose cumulative effect will be the provision of a large endowment fund for problems of research and the training of research chemists. The care and thoroughness shown in drawing up the details of the will and the confidence shown in the ability of the officers of the AMERICAN CHEMICAL SOCIETY to wisely administer such a fund point the way for similar gifts in the future.—[EDITOR.]

.....to convey, transfer, and pay all the rest, residue, and remainder of said trust fund, both real and personal, and wherever situate, to the AMERICAN CHEMICAL SOCIETY to be held by said SOCIETY IN TRUST as a separate fund, to be managed, used and expended by said SOCIETY as follows:

It is my desire and purpose that the fund be used for the encouragement and promotion of scientific and industrial research in chemistry, preferably in the United States, and that the fund be so administered as to provide for young men and women of demonstrated and exceptional capacity for chemical research, an opportunity for early recognition.

To this end I direct that the fund be held, managed, and invested by the AMERICAN CHEMICAL SOCIETY, and administered by the Directors of said SOCIETY.

Until such time as the annual income of the fund shall reach the sum of Twenty Thousand Dollars, one-half of the income shall be added to the principal of the fund, and in case of subsequent impairment of the fund, or diminution of the income therefrom, one-half of the income shall be similarly added to the principal until the annual income is restored to Twenty Thousand Dollars.

Until the annual income reaches the sum of Twenty Thousand Dollars, one-half of the income shall be devoted to the ultimate purposes of the fund, as follows:

From that half of the income available as aforesaid, there shall be set aside annually such sum as may be necessary to cover the cost of a gold medal and a bronze replica of the same to be awarded on the conditions and in the manner hereinafter provided.

The remainder of the available half of the income shall be divided annually into two or more research fellowships of equal amount, and these fellowships shall be awarded as follows:

The award shall be made by a committee of the AMERICAN CHEMICAL SOCIETY, consisting of seven members, selected annually by the Council of the SOCIETY from the membership of the Council. The first committee selected shall consist of three members who shall serve for one year, and four members who shall serve for two years, and thereafter the places of retiring members shall be filled annually by members who shall serve for two years. Not more than three members of the committee shall be members of the instructing staffs of educational institutions; and no members shall be eligible for more than two consecutive years of service. If a committee having the qualifications above set forth cannot be obtained from the membership of the Council, the Council of the SOCIETY shall have the right to select such members as may be necessary from outside the membership of the Council.

Candidates for the fellowships shall be required to submit to the committee at such time and place as may be designated by the committee, a thesis embodying the results of research conducted by the candidate, together with a written statement covering the candidate's training and experience in research, with such other information as the committee may require; and shall also submit an explicit statement of plans for continuing research under the fellowship. In selecting candidates, preference shall be given to those under twenty-five years of age, unless regularly enrolled in a college, university, or technical school of recognized standing.

The committee shall, thereupon, select from among the candidates complying with these requirements, the two, who, in the opinion of a majority of the committee are best qualified to utilize the fellowships effectively in self-development as research chemists; and shall award to each of them one of said fellowships. A fellowship thus awarded shall be held for a period of two years, unless the committee for cause decides at the end of the first year that it shall not be continued. A fellowship thus discontinued