of constitution, but maintains that race-decay has been produced because the death-rates of those living in the higher decades of life have increased, and that this degeneration will continue if other selective agencies are not introduced to take the place of those which sanitation is removing. However, he has not the courage of his convictions to suggest that we shall arrest our present methods until the other selective agencies—segregation of criminals, abolition of marriage amongst those affected with phthisical taint or insane tendency, etc., have been introduced.

Vaccination, which from his point of view is preventing the action of a race-improver, small-pox, is not even mentioned; and, to be logical, I should expect him to suggest its abolition. I think that the selective agencies mentioned by Dr. Haycraft are not lost sight of. Attempts are made to educate the public on these subjects, and I think that this subject of constitutional taint is being increasingly considered in arranging marriages. Any further measures at present would only lead to immorality, with its attendant evils. The thorny subject of dealing with syphilis I have not time nor inclination to enter upon. The segregation of criminals is to some extent enforced at present. Many crimes are committed through force of circumstances, and are atoned by the punishment meted out, but crimes committed by those of the criminal type are so habitual, and of such a nature that they mostly pass their whole lifetime in prison. It seems to me that to ascribe any degeneracy of the race, if it exists, to public health and social measures keeping the weakly-born alive to mankind is a very short-sighted and superficial method of looking at a complicated social problem. Are there not many factors besides these which are acting and interacting in a manner prejudicial to health? We know there is a rush from the country to the town, a tendency for people to crowd together on limited areas, to lead more bustling and irregular lives, and to meet with more severe competition in their daily life. The value of the products of the human race is not to be measured in muscle substance alone, and we know from history that many men who have enriched the stores of human knowledge would not have lived had such Spartan-like doctrines prevailed. However, gentlemen, I do not see that we need to think of resigning our positions and betaking ourselves to more fruitful fields of labour, nor to be deflected in the slightest from the path which we have taken.

A LESSON TO VESTRYMEN.—A member of the Sanitary Committee of St. Saviour's Board of Works, Southwark, has been summoned for having a house in so dilapidated a condition as to be unfit for human habitation. The magistrate ordered the premises to be closed, and exacted the substantial penalty of £20 from the landlord.

SEWAGE-FED "FISH."

By J. LAWRENCE-HAMILTON, M.R.C.S.

Many seaports and coast towns have their local sewage outfalls placed too near the shallow shore, especially where the tide recedes to a considerable distance.

Towns situated in a bay require additionally lengthened outfalls into the sea, so as to prevent certain local winds blowing the diluted sewage matter back on to the beach, shore, across bathing places, and thence offensive sewage smells into the town.

DEFINITION.

"Fish" includes amphibian and aquatic animals.

WARMTH AND SEWAGE LIKED BY "FISH."

Chemical and bio-chemical causes, conditions, and circumstances, including the heat evolved by putrefactive changes, make the sewage warmer than the local sea water into which it flows. Most aquatic and amphibian animals are attracted by warmth.

Professor Edwin Linton noticed chubs (Lenciscus attarius) and suckers (Catostomus ardens) swimming in a warm branch at 95°F. of a local river, into which a mountain stream, having a temperature of 48°F., discharged itself, making the mingled waters 55°F.

The trout avoided the warm stream and kept to the cold water, but the chubs and suckers—even when a big net was placed behind them—declined to enter the colder streams.

PHOSPHORESCENCE.

Although sewage is rich in phosphates, up to date I have been unable to learn that phosphorescence is relatively more common about sewage outfalls than elsewhere. Or, in other words, the numerous species of aquatic and amphibian animals, parasites, and bacteria which are capable of becoming phosphorescent, do not seem to specially favour or frequent the neighbourhood of sewage outfalls.

If this be the case, perhaps such water is either too impure a media for excessive phosphorescent life, or else the local aquatic plants absorb all available excess of phosphates.

Darwin thought that phosphorescence was decomposed organic particles, purifying the ocean.

When at Aalesund, in Northern Norway, rowing at night time about its harbour, as our oars struck the water, great beautiful pools of phosphorescent "fire" were remarkably plain.

In and about the waters of this seaport much fish refuse and dead fish would probably find their way, which evidently did not diminish the local phosphorescent animal life.

Those who are anxious to learn about animals, plants, and substances which can become phosphorescent, will find an excellent summary thereon in Chambers' Encyclopaedia, under the article

SEWAGE-FED "FISH."

**Slaughter-house Refuse in Sewers.**

From low-classed private slaughter-houses, diseased animal abominations are sometimes surreptitiously sneaked into the local drain, whence this filth travels through the town sewers and the outfall into the sea or river. Such offensive curiosities as the possession of a long length of diseased intestines (which are also used as sausage skins) may be seen hotly disputed for by a score or more of sea gulls, each of which pulls at the prize, even though swarming with parasites, putrefactive and pathogenic bacteria.

**Sewage is Oily and Alkaline.**

Owing to its grease and oil, together with its warmth and alkalinity, sewage discharging into the sea may make manifold long, oily stretches or spaces of smooth, diluted sewage water float for miles around and about the local outfall. Or, in other words, liquid sewage is warmer and of less specific gravity than the salt water, which may be calmed by the excess of oil, grease, and soapy materials derived from sewage.

This sewage "oil" is blown by the wind, borne by the tide, or carried by currents. During stormy surf seas, or big breakers near the shore, this, as other oily and soapy matter, has usually no appreciative effect in calming the troubled waters.

**Other Oily Streaks on the Sea.**

The more or less offensive stale oily patches, derived from sewage, floating on the water are smelt and distinguished by experienced fishermen, and still more readily by the keener scent of "fish," from the fresh, fine, oily, and greasy streaks often made at the sea's surface by large shoals of mackerel, pilchards, herrings, manhaden, etc. According to the fisherman-naturalist, Mr. Matthias Dunn, of Mevagissey, surface frequenting "fish"—including porpoises, porbeagle-sharks, dolphins, and the like—see, scent, or feel these oily streaks, which they make for from long distances.

In the wake of steamers, especially those worked by screw, besides the mechanical action of churning the water, the smoothed path is apt to contain some oil from the machinery, together with greasy

**Bilge Water,**

which often closely resembles sewage.

Whilst whales, salmon, and trout avoid oily and sewage matter, many other aquatic and amphibian animals used for our food delight in such media.

Petroleum, creosote, and similar substances are fatal to fish and fisheries. The leakages from the petroleum ships on the Volga are ruining the Astrakan sturgeon and sturgeon caviare industries.

**Animal Parasites in Sewage-fed "Fish."

Sewage-fed "fish" are particularly prone to be loaded with animal parasites and their eggs, which may develop a further stage within their consumers.

Lord Byron, in his "Don Juan" (v. 149), alluded to the Turkish plan of feeding "fish" on human corpses:

> If now and then there happen'd a slight slip,  
> Little was heard of criminal or crime;  
> The sack and sea soon settled all in time.  
> The public know no more than does this rhyme;  
> No scandals made the daily press a curse—  
> Moral's were better, and the fish no worse.

Sentiment set aside, it is surely quite as revolting to eat sewage fed "fish" as it is to eat aquatic and amphibian animals which have recently preyed upon human corpses.

Sewage outfalls into the sea are frequented by flocks of sea birds, whose guano, infected with animal parasites and their eggs, mix with the sea-borne sewage containing animal and vegetable town filth and refuse, including parasitic worms and their eggs, derived from man as well as from food animals slaughtered in the district. Because at sewage outfalls marine life is abundant; hence both sea birds and fishing vessels frequent such spots, where aquatic vegetation is often specially luxuriant, because of the local warmth and materials derivable from sewage.

"Fish" Life in Sewage Waters.

Though a certain proportion of sewage is liked by "fish," if in too great quantities it would be fatal to the life of aquatic and amphibian animals.

From time immemorial the Chinese have fed their carp on human excrement, whose salts have been previously extracted by water.

Cod, turbot, sprats, herrings, pilchards, oysters, clams, lumpers, periwinkles, mussels, sea anemones, scallops, lobsters, crabs, and the like are fond of sewage-fed waters in moderate amounts; whilst grey mullet, eels, tench, and carp can thrive and revel in much more filth-polluted waters.

**Sewage-fed "Fish" as Food.**

As fish are eaten without the consumer knowing whence they may have been procured, it is absolutely necessary to bleed them before blood-clothing, immediately gut, and thoroughly clean, a process which retards decomposition and makes the fish firmer, with a fresher, finer flavour. Thus prepared, dry cold air makes them imperishable. Immature herrings, sprats, etc., called "whitebait," are always eaten whole, unbled, ungutted, and uncleaned, and too often, like other bigger fish, insufficiently cooked. Whitebait are frequently taken from about sewer outfalls.
SEWAGE-FED OYSTERS, CLAMS, MUSSELS, PERIWINKLES, ETC., EATEN RAW.

Oysters, together with their contained sewage water, are eaten quite raw, to which the enteric fever of the Duke of York was attributed, as well as the recent—April, 1894—epidemic of Asiatic cholera in Constantinople, where, therefore, the sale of shell-fish was temporarily forbidden.

Scallops, cockles, mussels, clams, and other tasty bivalves, besides whelks, periwinkles, limpets, sea snails, etc., gathered from about sewage outfalls, especially when eaten raw, are likewise often the unsuspected cause of preventable epidemic diseases—as typhoid fever and cholera. Lobsters and crab pots are frequently baited and set about sewage outfalls.

Fish is seldom sufficiently cooked to destroy its animal parasites and their eggs, as well as the harmful, dangerous bacteria, which filth-feeding "fish" are notoriously apt to harbour. Medical correspondents have often sent me various living worms which they had found at table in "cooked"—or, rather, insufficiently cooked—"fish." Boiled fish requires long cooking, especially if it is thick, like cod or salmon.

TEMPERATURES AT WHICH "FISH" SHOULD BE COOKED.

If eaten at all, whitebait should be cooked at a temperature somewhat exceeding 400° F. Ordinary fish should be fried between 360° and 375° F., but if olive oil be used then it should be much hotter than when fat, lard, or butter are employed.

"Fish" from the mouths of rivers, docks, canals, streams, lakes, ponds, and other water-side premises receiving sewage matter are even in a worse sanitary position than sewage-fed marine fish. Hence the greater danger in eating raw molluscs with their juices, together with the enclosed sewage water, as in the case of the oyster, mussel, periwinkle, clam, etc.

CIVILISED MAN A "COOKING" ANIMAL.

Man has been often described as a "cooking" animal. In proportion as he is civilised, and educated in sanitary science, so does he become more and more careful, not alone as to the cooking of his solid food, but even, in some instances, he is cautious enough to have his fluid foods, like suspected milk or water, thoroughly boiled.

A low death-rate, with a low sick-rate, or longevity with a minimum amount of illness, is, in a great degree, the result of perfecting the processes resorted to so as to avoid pathogenic bacteria, parasites, and putrefactive food. Thus it is known that fatal trichinosis is practically almost exclusively confined to those nations who, like the Germans, eat raw ham, or ham insufficiently cured. Hence in a city where epidemics rage they principally carry off the poorer classes, whose food is generally more or less bad and scanty, and whose general environment is equally faulty.

THE BAD FOOD OF SAVAGES.

Again, it is in a great measure owing to carelessness, or inability to obtain cooked, healthy solid and liquid foods, including pure drinking water, that savages or semi-civilised races become gradually exterminated or extinct to make way for more cultured nations.

DOMESTIC ANIMALS.

Because of usually getting better food and drinking water, domestic animals live longer, where they are well cared for, as among the rich, than similar creatures whose owners are compelled by their poverty to more or less neglect their live stock, which therefore have comparatively a much shorter existence.

Where pasture and grass are scarce, as in some arctic regions, the occasional feeding of cows on fish may communicate a fishy taste and odour to the milk of such cattle.

The superiority of English, Scotch, and Irish breeding cattle and horses is to a great extent due to their improved surroundings and feeding. Notoriously in Oriental countries, where many domestic animals, as their dogs, have to feed and cater for themselves, such creatures are peculiarly prone to early fatal epizootic diseases, including parasitic affections. Hence dogs at the seaside eating putrid "fish" are liable to suffer from choleraic diseases. Every schoolboy knows that even a well-trained dog is too apt to seize putrid matter, such as a stray filthy bone.

WILD ANIMALS.

Wild animals are more liable to frequent fatal epizootic diseases than domesticated animals, which are more or less judiciously fed and attended to. The increasing extinction of many species of wild animals of former days may also be thus accounted for.

DISEASES ATTRIBUTED TO UNSOUND FOOD.

Of recent years scientific sanitary research and investigation have traced increasing numbers of avoidable diseases and epidemics to bad food, especially bad uncooked food and water. Therefore, one is more than justified in urging on the public the danger of eating uncooked oysters, clams, periwinkles, mussels, cockles, etc., especially as the consumer is not in the position to ascertain whether these animals, having been removed from sewage water, may not still contain such putrefactive matter, which would probably be destroyed by prolonged boiling.

In the case of oysters, cooking coagulates the albumen of the meat, rendering it tough and indigestible, and destroys the delicate flavour of these bivalves.

Few people would willingly risk the chance of a fatal fever for the pleasure of eating uncooked
oysters, clams, mussels, or periwinkles, which also frequently distribute the eggs of tapeworms or other parasites.

**No Law Prohibits the Sale of Sewage Fed Fish, Oysters, Shell-fish, etc.**

The present system of food inspection, especially as regards "fish," is an absolute farce, as the consumer is unprotected. Unfortunately there appears to be no law forbidding the sale of sewage fed aquatic and amphibian animals.

**SCHOOL CLOSURE FOR INFECTIOUS DISEASES IN TOWNS.**

By M. A. Adams, F.R.C.S., M.O.H., for Maidstone.

I have a word to say regarding school attendance in connection with the spread of scarlet fever and diphtheria. Of course, both are very contagious, and because children at school-going ages are most susceptible, it naturally follows that school attendance is a frequent means of propagation; consequently the closure of schools is often resorted to as a means of staying the spread of such diseases. To the best of my judgment, in towns at all events, when due care is taken, this course is seldom necessary, but often mischievous; practical experience convinces me that in the general way less discipline and intelligent observation, than by sending them home to run loose upon the streets and out of sight and beyond the reach of discipline.

I have repeatedly observed that the sudden accessibility of these diseases often follow upon "treats," holidays, harvestings, and the like gatherings, but seldom arise during the regular course of school attendance. My rule is, in every instance upon infection being notified, immediately to stop all school attendance from the infected house, and by communication with the school authorities concerned, to prevent its resumption from implicated households until all risk is past.

With diphtheria, closure of a school on occasion may be necessary, not for the purpose of distributing the scholars, but because the school building, or the soil upon which it stands, has become the actual breeding ground of the infection, and before the disease can be got rid of, radical methods of disinfection must be resorted to. In my belief the repeated reappearance of diphtheria in certain cases on the reassembling of schools is to be explained, not by the scholars bringing the disease back to the school, but by their return to an infected building; and probably this is possible with diphtheria more than with most other diseases, because the bacillus of diphtheria is capable of living a saprophytic life at a comparatively low temperature when circumstances are favourable, in the structure of the building or the soil upon which it stands.

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**OPEN MANHOLE VENTILATORS AND DIPHTHERIA.**

By Sidney Davies, M.D., Medical Officer of Health, for Plumstead.

The desirability of having manholes in connection with the sewers at frequent intervals is undisputed. The only question is whether these manholes should be closed, or should be provided with open gratings.

(a) **Open Manholes Ineffective and Unnecessary.** —The chief object of all ventilation of sewers is by giving vent to the sewer gas outside houses to diminish the chance of its finding its way to the inside of houses, whether by faulty traps, or by forcing the traps, or by faulty drains under houses, or in any other way.

We see that the advocates of these ventilators recognise the injuriousness of sewer gas by the very fact of their attempting to keep it out of houses. They say, however, that the gas is much more injurious inside houses than outside, and this is true. But when there is direct communication between a sewer and the interior of a house the sewer gas would be drawn into the house in spite of open manholes.

The proper way to prevent sewer gas from entering houses is by having a disconnecting syphon on the house drain and a ventilating shaft at its termination. If anything more than this is needed on the sewer side of the disconnection another ventilating shaft should be run up the house from the drain between the disconnection and the sewer. This would produce far greater security than any number of grid ventilators on the sewers.

Another object of open manholes is to so dilute the sewer gas with fresh air as to oxidise it and render it innocuous. But unfortunately this object is not attained even by having the manholes at frequent intervals, as many members of the committee have observed for themselves in Plumstead Common Road, where four manholes within 150 yards are frequently found all emitting vile stenches at the same time.

The fact is that when sewers are badly constructed, so as not to allow the sewage to escape rapidly, there is such decomposition and formation of noxious effluvia as no amount of open manholes can render innocuous. A foul ditch is a nuisance, though it be completely open to the air. Much more so a foul sewer only partially open.

So far I have shown that (1) open manholes are not the best means of keeping sewer gas out of houses; (2) they cannot by themselves be relied on to attain this end; (3) they are ineffectual in rendering sewer gas innocuous by oxidation.

(b) **Open Manholes a Nuisance.**—But these manhole ventilators are not only unnecessary, but they are undesirable for two reasons: (1) because

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*From Mr. Adams' Annual Report for 1893.

*Abstract of Report to Sanitary Committee, Plumstead.