The two cases previously cited, however, present many points of difference from *variola roseolosa*. There are (1) a plausible history of the double contagion; (2) a definite history of scarlatina, with the usual throat-signs; (3) a varied relation of intensity in the correlated diseases in the two instances—in the one case the variola, in the other the scarlatina, being the more pronounced. Again, the thermometric signs in the first case (a chart of which is appended) were peculiar—very

different from the usual history of the pyrexia of variola. There appear to be two waves—one for the scarlatinal, the other for the variolous period.

The treatment appeared most successful. At one period the case seemed hopeless. The defervescence was little less than extraordinary. Under the local influence of the carbolic acid, the desiccation and decadence of the pustules were rapid and complete. Exactly three weeks from the onset, the patient was well, and able to be transferred to the country.

A CHAPTER OF DIFFICULTIES IN APPLYING SANITARY LAWS.*

By LEONARD ARMSTRONG, M.R.C.S., South Shields.

THE town of South Shields, to which I wish to call your attention to-day, is situated on the sea-coast at the south of the mouth of the Tyne. Possessing within its boundaries a glass manufactory (almost the oldest in the kingdom), foundries, and extensive chemical and alkali works,

it early acquired the appellation of *smoky* Shields. As a consequence of the frequent impurity of its atmosphere, vegetation suffered in its vicinity, and trees became stunted and ceased to grow. Along with these pernicious effects on vegetation, it was observed that the rate of mortality ruled high; and one of our fraternity, Dr. Glover, pointed out that this excessive mortality was most visited on the juvenile part of the population. Since the incorporation of the borough, twenty years ago, the sewerage and paving of the town have vastly improved; the water-supply is also excellent, and a prosperous and increasing population can afford good food and clothing. In spite of these sanitary advantages the town has generally shown a mortality in excess of that found in Sunderland and Tynemouth. These are also sea-board towns and unions on the coast within a few miles of South Shields, and apparently placed under the same external conditions; yet, on comparing the Registrar-General's quarterly returns for the last two years, it is found that Sunderland averaged 24.05, Tynemouth 24.59, and South Shields 26.56, deaths per 1000 living.

To what can we attribute this comparative unhealthiness of South Shields? I believe this excess of mortality is due to the lack of pure air. The atmosphere is too often vitiated by smoke and chemical vapours, and the function of respiration in purifying "the blood, which is the life of man", is thereby impeded or imperfectly performed. As might be expected under such circumstances, infantile mortality is increased. The lungs of the young seem most easily influenced by atmospheric impurities, and so become vital tests, as it were, of the purity and freshness of town air. Independently of the injury to vegetation and the loss of health and comfort induced by the toleration of this smoke and dirt in most large towns, a financial feature, which has been somewhat ridiculed, ought not, I think, to be forgotten by those who believe in the sound morality of the old proverb, that "Cleanliness is next to godliness." It may fairly be assumed that every one who struggles for even moderate cleanliness under such conditions must be put to a charge of twopence per week at least for extra washing. In such a town as South Shields, with a population of 40,000, this charge would amount to a local tax of £17,000 a year—a sort of black mail levied indirectly. And why are these evils endured? Because our manufacturers do not comply with the requirements of the law, and our boards of health are too supine to do their duty and compel them.

Ten or twelve years ago some members of the Corporation, recognising the serious character of this atmospheric pollution, brought the matter frequently before the Town Council. Foremost amongst these advocates for a purer atmosphere were two medical mayors, Drs. Ridley and Wallis; for, although the promotion of public health is adverse to the interests of our profession, that profession has always been conspicuous in supporting measures of sanitary improvement, and the first to recognise their value. The Board of Health was urged into some degree of action. Notices were served on all smoke-makers that the provisos of the Smoke Act, etc., would be enforced; and a few offenders were actually summoned before the magistrates. Some admitted they had not done their duty to their neighbours, and asked for further time to make alterations in their furnaces; others stated that everything possible in their line of business had been done, but that to abolish offensive vapours and smoke in their case was tantamount to a suppression of that particular manufacture, and would prove a deplorable loss to the borough. The town surveyor—the only person called to support a conviction—was of course unskilled in such manufacture, and could not say or swear that the best means had not been adopted. The accused promised to do their best; no conviction ensued; and so the movement came to an end. The most serious difficulty in these prosecutions was this: many of the magistrates who had to convict, the town clerk who had to prosecute, the engineers who had to give evidence, were more or less engaged with tall black chimneys themselves, and, like partial parents, disposed to deal leniently with their own offspring. Under such circumstances it was not wonderful that the cry of "the more smoke the more money" prevailed; and the promoters of the movement gained nothing but vexation and personal annoyance by their efforts. Some years later another medical man, finding his own residence daily begrimed by an adjoining furnace, tried in his private capacity to get some remedy for this undoubted injury and annoyance. On different occasions he summoned the offender to the police-court. The bench again threw oil on the troubled waters, hoped the accused would be more careful, that the doctor would have no further reason to complain, and dismissed the case, leaving the latter to bear a nuisance as black as ever over his wall. What can't be cured must be endured, and so matters went on in the old way till the summer of 1868, when an additional dose of smoke and chemical vapours was inflicted on the town by the extension of works for the manufacture of alkali and bleaching-powder, in its very centre. This factory frequently poured out volumes of chlorine and muriatic acid gases, producing a feeling of suf-

* Read before the Public Medicine Section at the Annual Meeting of the British Medical Association, in Newcastle-upon-Tyne, August 1870.

focation and cough in persons who happened to be to the leeward of the works. Added to these was a constant exhalation of a villanous form of sulphuretted hydrogen from a deposit of soda-waste adjoining the works. So great became the outcry about this offensive deposit that the proprietors promised that it should be covered over, and that in future the refuse should be carried outside the town, to a ballast-heap near the seashore. Here the deposit, being exposed on the side of the hill, became more offensive than ever, and the residents at Tynemouth complained that the stench, even at that distance, was sickening, when it was wafted across the harbour. These abominations having been endured during the summer and autumn, they became at last intolerable. The inspector under the Alkali Act was appealed to. He replied that his office was simply to see that not more than five per cent. of the muriatic acid gas evolved in the manufacture escaped, and this requirement of the Act was complied with when he visited the works. One can only conclude from this statement that, if no more gases than the Alkali Act permits were allowed to escape, then the Act in question does not protect the public from either injury or annoyance.

The Board of Health and Nuisance Authority contented themselves by sending out harmless letters and threats, and by referring the matter to a so-called Sanitary Committee. As private remonstrances are unpleasant, and too frequently beget private enmities, it was thought by a few that a public meeting might be useful in rousing the authorities to take more active measures for suppressing these nuisances. A meeting was convened by circular on the 10th November, 1868, and was well attended. It was resolved—"That the increasing production of smoke and chemical vapours, injurious to the health and property of the people of South Shields, is a nuisance calling for immediate abatement, and that a sanitary association be formed for the purpose of securing a purer atmosphere, and protecting the inhabitants against the aforesaid nuisances." A deputation was appointed to attend the next Town Council meeting, and four medical and other gentlemen attended on the occasion and urged the Council to put the provisions of the Sanitary Acts in force, drawing attention to the fact that, although a sanitary inspector had been appointed, who did some service in preventing ash-pits, pigsties, and lodging-houses, from becoming unwholesome, there were other nuisances in a higher stratum that demanded a remedy; and that, as the corporate funds were taxed for the purpose of sanitary inspection, that inspection should be made as directed by the Sanitary Act. The deputation was most courteously received by the Mayor, who promised that the matters brought before them should receive the earnest attention of the Council; and they were referred to the Sanitary Committee to report.

There was small prospect of any activity being shown in the work by this body—the official Board of Health and Sanitary Authority; for at that time the Mayor was an alkali-manufacturer, the ex-Mayor was an alkali-manufacturer, and the Chairman of the Sanitary Committee was another alkali-manufacturer. However, by dint of agitation, writing in the newspapers, etc., some little stir was made; threatening letters were again sent to the most offending alkali company; and in the course of months some reduction had taken place in the emission of acid fumes, and the abomination on the "Bents" had been covered with waste gravel. Again and again, however, the choke-gas made itself felt, and no steps whatever had been taken to abate the smoke nuisance. Seeing this stagnant condition of the Corporation, it was determined to send a memorial to the Home Secretary, calling his attention to this neglect of the Board of Health in enforcing the provisions of the Nuisance Removal Act and the provisions of the Local Government Act, especially in respect of the smoke and chemical vapour nuisances. This memorial was numerously signed, and transmitted to the Home Secretary in July of last year. It brought down a forcible letter from Mr. Tom Taylor, asking "that the Secretary of State may be informed what measures had been taken by the Council under the 49th section of the Sanitary Act, imposing on them a duty to deal with black smoke from furnaces as a nuisance included within the operation of the Nuisances Removal Act". To this inquiry the Sanitary Committee, in their reply, avowed in the first place, "that, as regards steam-boilers, there are means of preventing smoke, and that they intend now to enforce these means".

Be it observed, that these means had been known for years. Ten years before, this very Corporation had issued notices to enforce the consumption of smoke in such cases, with the result already detailed. In the second place, it recommended "that means of prevention be enforced whenever their efficiency has been practically ascertained"; and in the third place, "it had to consider how far the law can be enforced without unduly affecting the manufacturing prosperity of the town". Here a public authority constituted to give effect to the law manfully suggest excuses for evading it, by conjuring up the old bogie of manufacturing prosperity. Well, the result of this memorial has been this.

Formal notices were again served on the possessors of black chimneys in October last. A few have adopted some apparatus; others looked more strictly after their stoves for a time; and now, after another year has nearly past, we find no appreciable improvement, some portions of the town constantly enveloped in "clouds and darkness", and no effort made to diminish the nuisance.

Such is a meagre outline of the painful struggle in attempting to obtain pure and fresh air in a manufacturing town. We are not alone in having to endure this hope long deferred. A most influential meeting was held in the Guildhall in Newcastle about a year ago to discuss this important subject. At that meeting, some of the most practical and accomplished manufacturers in this district assured us that it was possible, without injury to manufacturing prosperity, greatly to lessen the present polluted condition of our atmosphere. A committee, containing the Mayor, Sir W. Armstrong, Alderman Bell, Captain Noble, Alderman Newall, the Sheriff, and others, was formed, "to consider and suggest measures for the prevention of these nuisances". High expectations were aroused: one doubting sufferer made a suggestion that the meeting should adjourn for two months, that there might be no evasion and a speedy report. The Mayor hoped the Committee would finish their labours and report long before that date. The unbelieving party, with something akin to prophetic foreboding, retorted: "In the meantime, I suppose, we must continue to live in hope and die in despair." It is now about a year since that very excellent meeting was held, but the report from which we had hoped so much still looms in the future. Whether the dolorous and doubting party has died in despair, or still lives in hope, I am unable to tell you.

One conclusion may, I think, be fairly drawn from this simple history. The sanitary laws against nuisances will mostly remain dead letters so long as they are intrusted to, and administered by, local authorities. Experience shows that a minority, however energetic, in a board of health, a complainant goaded by private injury, and an association appealing to the Secretary of State, are equally impotent, and all strive in vain to effect any permanent improvement in these matters. Although pains and penalties, impartially enforced, have been found efficacious, local and interested authorities will never enforce them. Permanent improvement has been secured in London, where a Government inspector, independent of, and superior to, local authority, is appointed. In this neighbourhood, Lord Ravensworth's statement about the Smoke and Alkali Acts at the meeting alluded to is still, except during some short periods, true. He said: "In practice I do not perceive that any benefit whatever has resulted from their legislation in the towns of Newcastle and Gateshead. A very decided improvement has undoubtedly taken place in London and the suburbs. Why is the difference noticeable between the two places? This question seems only capable of one answer: Because in the one case the provisions of the law are enforced; in the other they are not."

The remedy for this failure in legislation is obvious; and I trust that our President, and others who have influence with the Sanitary Commission now sitting, will recommend that in future all sanitary acts should not be permissive, and should be carried out by educated and competent sanitary inspectors appointed by Government, and unfettered by local interests and feelings.

PROFESSOR FLOWER'S HUNTERIAN LECTURES ON THE TEETH AND ALLIED ORGANS IN THE MAMMALIA.

Delivered at the Royal College of Surgeons of England.

LECTURE VIII.—Monday, March 6th, 1871.

In a well defined group like the Carnivora, the corresponding teeth in its various members can be readily recognised. For instance, on comparing the Cat and the Dog, there can be no question that the absent teeth in the former are the two posterior molars and the anterior molars. In the Cat, then, the upper præmolars are the second, third, and fourth; of these, the second is often deciduous.

The milk-teeth of the Cat resemble, on the whole, the permanent series. The incisors and canines are smaller than in the adult. There are three molar teeth in the upper jaw: the first is a small simple tooth; the next is a tooth having sectorial characters, but with its inner lobe opposite the middle of the blade instead of its front edge—an arrangement which is present in some other Carnivora. In the lower jaw, the sectorial tooth has a more developed heel.

All the animals of the genus *Felis*, with trifling exceptions, are alike as regards their teeth. The anterior præmolar is sometimes absent; sometimes there is a small heel on the lower sectorial tooth; and there are variations in the degree of development of the inner lobe, which is smallest in the Cheetah.