My visit to Matura was made at his request, and the reception he gave me was kind and flattering in the extreme. He insisted on driving me to Dondera. His carriage, a well-appointed English phæton, was drawn by two fine horses of Australian breed. A handsome black Tamil in a red turban and silver-laced livery, ran before us all the way. . . .

"The long blue peninsula of Dondera Head, with its forests of cocoa palms, is visible on the road from Matura long before it is reached. It is the most southerly point of Ceylon, lying at 5° 56′ N. latitude. For more than 2000 years the temples erected on this spot have been the object of pilgrimages, only second in fame to those to Adam's Peak. Thousands of pilgrims and devotees flock here every year, and the temples have been dedicated alternately to Buddha or Vishnu, according as the native Singhalese or the Malabar invaders had the upper hand. Three hundred years ago, the chief temple was an Indian building of the first rank, so large, that from the sea it appeared a considerable town; its numerous pillars and statues were richly decorated with gold and precious stones. In 1587 all this magnificence was destroyed by the Portuguese, who carried off the rich spoils of the interior of the temple. The enormous extent of the building may be estimated by the ruins which remain. In one corner a very large Dagoba has been left standing close to several ancient and colossal Bo-gas or sacred fig-trees. The ruins of a smaller temple are to be seen on the narrow tongue of land which forms the extreme southern point of Dondera Cape. They consist of octagon pillars of porphyry, rising in lonely desolation from the granite rock, and washed by the foaming surf which surrounds it. At low tide I collected many curious marine animals in the natural basins among these rocks, and sat for a long time lost in thought upon this, the most southerly point I had ever reached. It was late in the evening before we returned to Matura. The following day (January 19) was dedicated to a long marine excursion. The chief, Ilaugakuhn, had placed a capital sailing canoe at my service, and my trip extended a long way to the south of Dondera Head. It was glorious summer weather, and the north-west monsoon blew so strong that it was all my boatmen could do to keep the canoe from capsizing. Our speed was almost equal to that of a powerful steamer. No better illustration could have been found of the ease with which the narrow Singhalese canoes cut through the waves, or rather, glide over their crests. As the island receded from our gaze, we had a lovely view of the blue mountain masses, crowned by Adam's Peak, rising from the palm forests of the plains.

"After about four hours of this rapid sailing we became aware of a broad bright streak on the surface of the ocean, extending in the direction of the monsoon, from north-west to south-east, and about a mile wide. I pronounced it at once to be a pelagic stream or current, one of those narrow ocean rivers which frequently occur both in the Ocean and the Mediterranean Sea, and which owe their origin to the amalgamation of huge shoals of marine animals. As we drew nearer, my surmise proved correct, and I was rewarded with an extraordinarily abundant and interesting capture. A dense mass of pelagic animals, in endless variety, besides numerous larvæ of worms, starfish, crabs, molluscs, &c., swam hither and hither, and all the vessels I had with me were speedily filled. I only regretted not to have brought enough to contain specimens of all these zoological treasures, among which were many rare and hitherto undescribed varieties. I returned to Matura late in the evening, richly laden with booty, which would provide me with interesting work for many years to come. It was a pleasant reminiscence of the fifth degree of north latitude. My Singhalese were so skilful in taking advantage of the monsoon, that we returned almost as quickly as we had gone, and landed safely at the mouth of the River Nilwella. The view of this delta from the sea is very picturesque, and both banks of the river are thickly wooded. I went up the stream in a canoe on the next day, and was filled with fresh wonder at the unexampled luxuriance of the forest vegetation.

"A melancholy task awaited me on my return to Belligam. I had to bid farewell to the spot on which I had spent six of the happiest and most interesting weeks of my life. The impression of this parting is as vivid in my mind as if it were still to come. The familiar room which had served me for parlour, bedroom, and study, for laboratory, museum, and painting-room, with all the pleasant memories that had centred in it, was empty and bare. In front of the house, under the great teak tree, stood the two bullock-carts laden with my thirty chests of specimens, &c. Beyond the garden-gate were ranged row upon row of the brown villagers watching the departure of the stranger who had been so great an object of curiosity and amazement to them all these weeks. I took leave personally of the two chiefs and of all the more important inhabitants of the village. Good old Socrates, with sorrowful mien, produced for the last time the best of his bananas and mangoes, annonas and cashu-nuts. For the last time Babua climbed my favourite palm to offer me one more draught of sweet, cool cocoa milk. Hardest of all was the parting with my faithful Ganymede. The poor lad wept bitterly, and earnestly begged me to take him with me to Europe. It was in vain that I sought to persuade him, as I had often done before, that this was impossible, and that he could not live in our icy climate and beneath our grey skies. He clung fast round my knees, and assured me that he was ready to follow me anywhere without hesitation. I was obliged at last to disengage myself almost by force, and mount my vehicle. As I waved a last adieu to my dark-skinned friends, I had all the feeling of Paradise Lost—'Schoner Edelstein! Bella Gemma!'"

THE SANITARY INSTITUTE

ONE of the first objects which the Sanitary Institute of Great Britain has set itself to accomplish is the diffusion throughout the country of such information as shall lead to increased knowledge concerning the laws of health, and to an improvement in the conditions under which people live. Amongst the means by which it is sought to attain this object at each annual congress, is the delivery of public addresses in the several sections. This course was, as usual, followed at Newcastle-on-Tyne, and many of the addresses contained matter of much interest.

Dr. Embleton as a resident in the borough visited by the Institute, referred to such measures as had been adopted in Newcastle to secure greater cleanliness of air and water. He deplored the manner in which air was still contaminated by the products of the combustion of coal in the large manufacturing districts; he vividly described the conditions resulting from the constant inhalation of the solid and gaseous matter contained in smoke, and having reference to some of the principal local trades, he explained how hurtful from an economical point of view was the diffusion into the atmosphere of the valuable, unburnt, and therefore wasted carbon, the carbonic acid and oxide, the sulphurous acid, and the fumes of hydrochloric acid, of lead, copper, arsenic, and other vapours. Looking hopefully into the future, and anticipating that with the growth of knowledge in matters relating to health, there would also come a material increase in the duration of human life, he sought to give some estimate of the normal length of the life of man. Accepting the rule laid down by Buffon and Fleurens that the full term of normal life is dependent upon the age at which growth is completed, he pointed out that according

to Dr. Quain, the epiphyses of the long bones of the extremity in man are not perfect as regards their ossification until the age of from 23 to 25 years. At that age natural growth is finally completed, and Fleurens, multiplying this age by 5, brought man's normal age to some 125 years. Dr. Farr has been less hopeful, and has regarded the natural term of human life as at about 100 years, whereas he has shown that the actual mean age at death under existing circumstances is slightly under 41 years. Man, according to Dr. Embleton, is himself greatly to blame for his short existence, and he urged his hearers not to go away contented, merely because health officers were now devoting all their time to the removal of conditions inimical to life, but rather themselves to attend to the sanitation of their bodies, their houses, and their surroundings.—Mr. Henry Armstrong, Medical Officer of Health for the City, gave a somewhat detailed history of Newcastle, from a health point of view. Having regard to the many difficult sanitary problems to be dealt with, he urged that it was necessary to remember the extreme antiquity of the borough, and in estimating what had been done, to compare the present with the more remote past. In the thirteenth and fourteenth centuries, epidemics, which lasted from one to three years, occurred in the borough. In the time of James I. so little regard was had to cleanliness, that the "dunghill" within the castle precincts "had increased to such a size and bigness, that it was in length 98 yards, the depth of it was 10 yards, and the breadth of it 32 yards," some 27,000 tons of filth having thus been allowed to accumulate. In the seventeenth century the Great Plague was one of eleven epidemics; it alone caused 7000 deaths, and it led, by the almost complete desertion of the town and port, to a ruined trade and wasted treasury. Even in 1853, at the date of the then prevailing cholera epidemic, it is reported that the town so abounded in narrow yards, lanes, and "entries," that in one district alone there were streets exceeding a mile in length, which had an average width of some four feet only. Since then, rapid progress has been made; good water, improved sewerage, and better dwellings have been provided, and although much remains to be done in an ancient city which is in certain parts so crowded as to prevent that proper movement of air about dwellings which is necessary to health, yet the reduction of the yearly death-rate per 1000 by ten in as many years, and the diminution in the same time of typhus to one-fifth of its prevalence in the period immediately before, are matters of congratulation, and tangible results of good work effected.—Prof. Henry Robinson, in dealing with the question of house sanitation, pointed out that not one quarter of the dwellings of all classes—high or low, rich or poor—are free from dangers to health, due to defects with respect of drainage, water, or ventilation, and he gave a summary of the rules which should everywhere be laid down to secure entire disconnection between the interior of houses and the public sewers, basing his remarks in this connection on the model series of bye-laws issued by the Local Government Board. Mr. Robinson's estimate of the proportion of unhealthy houses is, we fear, below the mark, and in towns it is probable that the houses of the well-to-do exhibit greater sources of danger than those of the poor, and this by reason of the number of pipes passing from cisterns, baths, sinks, lavatories, &c., directly into the drains. By means of these direct connections sewer air can, notwithstanding water-traps, easily make its way into dwellings, and the more numerous they are, the greater the danger. Dealing with the question of sewer-ventilation, Prof. Robinson urged the necessity for frequent ventilating-apertures in the course of the public sewers, and in considering the best method of effecting this, he objected to the construction of ventilating shafts in connection with dwellings, deeming it desirable that the ventilation of the main sewer should be accomplished independently of the ventilation of house drains. On the question of water-supply, Prof. Robinson pointed out, as we had already done in commenting on Capt. Galton's address, that chemical analysis could not be regarded as alone sufficing for the determination of the wholesomeness or otherwise of a water-service, especially in the case of rivers liable to contamination by animal organic matter, and he laid it down as a rule that the only way to insure perfect safety was to exclude all waters which were not altogether free from the possibility of pollution. The view held by Mr. W. G. Laws on sewer ventilation differed entirely from those of Prof. Robinson. He advocated the extension upwards of the soil-pipe of houses in such a way as to convey a current of sewer air through the house drain to a point above the roof, and hence he objected to the existence of a trap in the course of the house drain to the sewer. There is one fatal objection to this system, and that is, that if the slightest failure occurs in the plumber's or mason's work, the foul air from the sewer makes its way into the houses, a result which has often ensued, and this with fatal consequences. By the adoption of the principles laid down in the Model Byelaws, and which received Prof. Robinson's commendation, a current of fresh air instead of foul air would constantly pass through the house drains, and this is the result which architects should aim at securing. How far the "gas chimney" advocated by Mr. Laws would answer, it is difficult to say, but we would point out that as yet the Legislature has given no powers to enable authorities to make use of dwellings for the purposes of the ventilation of public sewers.—Mr. E. C. Robins, F.S.A., drew the attention of the Congress to the admirable work on the exclusion of sewer air from houses, which has recently been published by Dr. Renk, of Munich, and which deals with this important question in much detail, and in a thoroughly scientific spirit. One very important question is raised by Dr. Renk, namely, whether the mere inhalation of air from sewers is ever provocative of specific forms of disease. He is inclined to the opinion that the particular matter of infection cannot pass into the human system by means of the superincumbent air alone. Doubts as to this have been raised before, but the emanations from sewers are largely composed of aqueous vapour, which must be regarded as capable of holding infective matter in suspension, and Dr. Frankland, in his paper before the Royal Society, has shown that in the process of the breaking of minute bubbles on the surface of flowing sewage, liquid particles capable of conveying infective solid particles are largely transported into the surrounding air.—Mr. James Leman contributed a useful paper summarising the conditions under which it is desirable as far as possible to separate rainfall from sewage with a view to securing an efficient method of sewage disposal. The adoption of the so-called "separate system" has unquestionable advantages as regards towns which are so circumstanced that it becomes imperative to reduce, as far as possible, the amount of liquid to be dealt with at the outfall, but it can never be absolutely carried out, for it is nearly everywhere necessary to admit into the sewers such rain-water as that which falls on the surface of roads and which is liable to be contaminated, and also to make provision for the occasional flushing of sewers during storms.—Dr. Bartlett, F.C.S., communicated an interesting paper on the influence of suspended matter on health. He detailed at some length a series of failures to procure specimens on the one hand, of the infectious matter of the various contagia, and, on the other, of the particles which swarm in the air emanating from sewers and other sources, and which give rise to unwholesome conditions of air. He next described how resort was had to the peculiar and beautiful waste product of the smelting furnace, slag-wool, as a medium through which to filter air, and how by its means floating particles composed of living organic matter, consisting in part of cells or cor-

puscles of animal origin had been found in air which had been vitiated from certain sources, and how by means of the discovery the sources of evil were detected and hence done away with. Dr. Bartlett holds a strong opinion against the probability of finding specific disease germs in any form by which our present powers of observation can recognise them, but he is equally impressed with the indications afforded by the results of some of his experiments as to the noxious influence of animal organisms, including, perhaps, the specific matter of the various contagia and of tubercle, which are often contained in impure air.

Capt. R. T. Hildyard drew attention to the influence for good which might be exerted by medical men if, in the course of their private practice, they had more regard to the sanitary conditions under which their patients were living.—The Hon. J. A. R. Russell brought gether a large amount of carefully-prepared meteorological and other statistics to show how climate improved with slight elevation. In a series of conclusions to which his observations had led, he pointed out how the ranges of temperature, yearly, monthly, and diurnal, were less at certain elevations than in lower sites, and he regarded it most desirable that every house should be built on arches or on piers admitting of ventilation above the ground level, and that in country districts no house should be considered habitable of which the floor is on a level with or below the ground.—Miss Yates, Hon. Sec. to the Bread Reform League, pointed out the advantages of wheat-meal bread over white bread, both as regards its nutritive properties and otherwise, and urged its general use as a means of promoting national health, especially amongst the classes depending on bread as their main article of food.

ON THE PERCEPTION OF COLOURS BY THE ANCIENT MAORIS

IN an interesting paper on this subject by Mr. Colenso, he gives a great deal of information on this subject, derived from his individual experience during a very long period of dwelling among the Maoris, and that before the country was settled, and by his having travelled very much among them, frequently in parts where no white man had ever been, sometimes on the battle-field, both during and after the fight, ever with them as medical man, often in the confidence of their best head men. The colours of black, white, red and brown were the prized and favourite ones. The purer states, especially of each of these colours were highly valued, to which may be added green and yellow. These several colours and their varying hues comprised nearly all that pertained to their dresses and personal decorations, to their principal houses and canoes. In the olden times a chief's house might truly be called a house "of many colours," which were artistically and laboriously displayed. Each tint or shade of colour bore its own peculiar name plainly and naturally, or figuratively sometimes both. They possessed a fine general discrimination of the various shades and hues and tints ; they could give an accurate description of a rainbow, of all its various colours ; they noticed the iridescent hues of the feathers of a pigeon's neck, of some shells, and the delicate evanescent tints on the ventral surfaces of many fish. From their general hues alone the Maoris could accurately tell whether far off and to them unknown districts were covered with a vegetation of fern or flax (Phormium) or grasses, but far above all their fine discrimination of delicate hues and shades was correctly shown in their nice distinction of the various tints of the flesh of the several kinds of kumara and taro. Once travelling on the coast, nearly forty years ago, Colenso met an old chief who told him that long ago he had cultivated a variety of the taro, which is called Wairuaarangi, but that it had long been lost. Knowing this sort from having met it in the north, and remembering the delicate and curious pink colour, Colenso tested the knowledge of the chief by asking what colour it was, which he immediately minutely described. They had early succeeded in getting brilliant black and red dyes. The old Maoris had a peculiar bias towards neutral colours. Blue was certainly known to them, and they obtained it from two sources, one mineral, the other vegetable ; and they had even distinct names for several shades of blue. Throughout this paper Mr. Colenso criticises and contradicts many of the assertions made by Mr. Stack, from probably an insufficient knowledge of Maori, in a memoir recently published on the colour-sense of the Maoris (*Trans.* New Zealand Institute, vol. xiv. p. 49).

FRIEDRICH WÖHLER

WÖHLER is dead. A man, who was born four years after Priestley died, who worked with Berzelius, who was engaged in chemical research when the brilliant genius of Davy was ranging over the whole field of chemical phenomena, who was contemporaneous with Liebig and Graham—this man has but now passed away from our midst.

Wöhler witnessed, and well bore his part in helping on the many great advances which chemistry has made since the science was founded by Black, Priestley, and Lavoisier.

Friedrich Wöhler was born in 1800 near Frankfurt ; he graduated as Doctor of Medicine at Heidelberg in 1823, but in place of pursuing the study of the uncertain art of medicine, as he tells us in his "Reminiscences," he determined to devote himself to the more exact science of chemistry. Recommended to Berzelius by Gmelin, Wöhler spent the winter of 1823-4 in the laboratory of the great Swedish chemist.

As we read the Reminiscences of Wöhler's youth—published a few years ago in the *Berichte* of the Berlin Chemical Society—we are ready to exclaim that it was impossible that, with the appliances which he had at his command, Berzelius could accomplish chemical work of any value. A few tables, an oil lamp or two, a large jar of water, basins and flasks—that was nearly all. The ancient Anna cooked in the kitchen, where also stood the sand-bath and the rarely-used furnace ; Anna still spoke in these days of "oxidised marine acid gas ;" but Berzelius was beginning to think that it might be better to say chlorine.

Five years later we come to a date memorable in the history of chemistry. Hitherto it had seemed as if the boundary which chemists had found it convenient to draw between organic and inorganic chemistry had a real existence in nature ; but Wöhler's preparation of urea, in 1828, from constituents of mineral origin, showed that this chemical boundary was as unreal as any other drawn by the too ardent devotees of system ; and that, as Graham said, in nature "distinctions of class are never absolute." The artificial barrier broken down, the living science of the chemistry of carbon compounds rapidly grew and overspread the place where the dead wall had been. Wöhler's discovery seemed a small one at the time, but what great fruit has it borne :

> "Walls admit of no expansion,
> Trellis work may haply flower
> Twice the size."

About this time (1830) the reaction led by Dumas against the Berzelian system of classification was growing in strength ; in their zeal to overthrow the evils which had arisen from the axiom of the Swedish chemist—that every compound must be built up of two electrically opposed parts—chemists had sought likewise to demolish the conception of compound radicles, which formed so marked a feature of the Berzelian system.