

from the rupture of a suppurating mesenteric gland; the patient had suffered from mesenteric disease some years previously.

- II.—DEATHS ARISING DURING THE VACATION.
1. *Diphtheria*.—A case occurred while on a visit to the Isle of Wight in September, 1887.
 2. *Scarlet fever*.—A case occurred in April, 1890, while studying French in Paris.
 3. *Erysipelas of head and face*.—This case occurred in 1891 at home.

TABLE I.—Showing the Diseases causing Death during Term and Vacation between Jan. 1st, 1871, and Dec. 31st, 1895.

Diseases causing death.	During term.	During vacation.
Pneumonia	1	—
Pleurisy	1	—
Scarlet fever	1	1
Diphtheria	1	1
Typhoid fever	1	—
Cerebro-spinal meningitis	1	—
Erysipelas of head and face... ..	—	1
While running	1	—
Peritonitis	1	—
Total number of deaths which occurred } during term and vacation	8	3

TABLE II.—The Mortality arising amongst 400 Adolescents during the Twenty-five Years commencing Jan. 1st, 1871, and terminating Dec. 31st, 1895.

Deaths arising from all causes per annum.		Death-rate per cent. per annum.
Term = two-thirds of year	0·32	0·08
Vacation = one-third of year	0·12	0·03
Total for year =	0·44	0·11

In all the previous series of papers the records have related to the *boarders* at school only, as I have no knowledge of the *day scholars* except in so far as individual parents do me the honour to consult me. But in recording the deaths I could not feel it consistent with my duty under any pretext to omit a death in any part of the school, whether in term or vacation. The average number of boarders in the school has been 400, but when the day scholars are included the average is as nearly as possible 435. The two deaths, Nos. 7 and 8, occurred amongst day scholars, and although they were both under my care, yet in strict accuracy they should not be included in calculating the death-rate amongst 400, but amongst 435, which reduces it from 0·08 per cent. to 0·07 per cent. Further, this makes the deaths amongst the boarders at school exactly the same as amongst the boarders at home when the time is taken into consideration. Or, to put it in another form, during a period of twenty-five years, amongst 435 adolescents, 6 died while residing at school, and 5 while residing at home.

It will have been observed, in studying these records which I have had the honour and privilege of placing before the profession, that of recent years some of our *illnesses* have apparently increased, which should not be the case with our extended experience. But the increase is only apparent: it arises from an increase in *numbers* in the school; for whereas during the twenty-five years we have had an average of 435 all told, at the present moment there are 539 boys in the school.

What a privilege it will be for the physician who records the next twenty-five years of medical school work, for with early paracentesis for pleurisy, with certainly antitoxin for diphtheria and possibly antitoxins for pneumonia, scarlet fever, typhoid fever, cerebro-spinal meningitis, and erysipelas, he will scarcely require certificates of death to be placed at his disposal.

Rugby.

SOME REMARKS ON VAPOURS, SPRAYS, AND FUMES.

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WHEN the great benefits which have been obtained from the inhalation of chloroform, ether, and nitrous oxide are observed it must be admitted that the administration of agents in the form of vapour is a subject of interest and importance. The change of any substance from the fluid state to that of vapour is generally due to the action of heat, and this is also true when the substance is changed from the solid state to that of vapour. When such substances as opium or the leaves of various plants are converted into the form of vapour it is usually necessary to effect the change by the process of combustion—that is, by raising the temperature far above that which is necessary when the substance we are treating is in the fluid state and requires only to be raised to its boiling point—at least, not above it. It is proper, therefore, to distinguish clearly between vapours, sprays, and fumes, for sprays are only changes from the fluid state to one of very fine division of particles, without elevation of temperature; while fumes are the results of slow combustion, which effects not merely a change of condition of material, but a disintegration of components and often some chemical decomposition.

How little this subject is understood is proved by the last Pharmacopœia into which the vapores were introduced. Any criticism of these “vapores” is unnecessary, as their inutility and insignificance are generally recognised. Whenever the physician desires to administer any medicinal agent in the form of vapour he finds it difficult to determine without further experiments how he may best effect it. If he takes that class to which camphor, menthol, benzoic acid, and many other species belong he will have to consider whether they require to be dissolved in water or some more active solvent in order that he may obtain them in such form and strength that allow of their inhalation. If he dissolves one of them in some liquid which he can easily convert into vapour, the question will have to be decided to what extent the substance he has dissolved is affected by the vaporisation of the solvent liquid. In some cases he will find that the active substance is volatilised much below the boiling point of the liquid and in others very little if at all so. Although an oil such as that of eucalyptus floats on the surface of water it is not easy to volatilise it by boiling the water, while such a substance as thymol is volatilised with a rapidity far greater than that of the water which contains it.

These general remarks are made simply for the purpose of directing attention to the need that exists for far greater knowledge than is possessed at present, not of the therapeutic value of various agents, but the mode in which they should be treated in order to have them in such a form that they can be used for clinical purposes.

In regard to sprays the physician is in a better position, as there are various well-arranged instruments which enable him to convert fluids into the form of sprays by the simple action of atmospheric pressure and admixture.

When the question of fumes is considered the strange and vastly wide influence exerted by the smoking of tobacco, opium, and a few other vegetable substances cannot but be attentively regarded. On analysing what is meant by the term “smoking” it is seen that really combustion is promoted by the effort of inspiration and that thus are converted into the form of vapour the active properties of the vegetable substances that are employed. One cannot obtain the active property of opium by volatilisation in such a form that it can be inhaled in the same way that a volatile substance like menthol or camphor can be treated. Opium may be added to water or spirit, but if the solution is heated the liquid does not part with the opium and no effect is obtained by its inhalation. To convert opium into the form of vapour slow combustion must be used, and how this may best be done requires consideration. The same remark applies to many other active medicinal agents—notably datura and stramonium and cannabis indica. I am not dealing with the question of the therapeutic value of any of the substances, but with the best method of combustion. A simple principle has been applied by which this can be easily effected. By

the action of a jet of air playing in a small tube the combustion of the leaves of plants or of such a substance as opium is promoted and vapour is given off which contains the active properties of the leaves or other parts of the plant which is being burnt. Under the name of the "Zephyron" Messrs. Maw, Son, and Thompson are introducing to the profession an apparatus which acts in the way described, and whether any benefits may be obtained from its use remains to be tested by clinical experiment. The chief value of the zephyron depends on the entire novelty in that a small elastic ball produces the jet of air by which combustion is effected, and there is no necessity to use the heat of a spirit lamp to obtain the force required. It may be well to observe that the inhalation of fumes obtained from smoking is not an easy matter, for these fumes are not as a rule inhaled into the lungs. There seems to be some advantage in administering certain medicinal agents by inhalation over that of introducing them into the system through the stomach by administering them in the solid or liquid form. It is unnecessary to criticise the great benefits obtained by the method of subcutaneous injection, and I will not venture to compare it with the inhalation of fumes beyond remarking that the latter is simpler and more easily effected. Those who have seen the zephyron are favourably impressed with its utility, as it enables the physician to administer fumes to those who are unable to smoke, and even for some who can do so it makes inhalation far easier. Where the leaves of plants are used, as in the preparation of powders or cigarettes for the relief of asthma, there does not seem to be much difficulty in obtaining their combustion by the addition of nitre. The saturation of paper with solutions containing the active properties of drugs has long been adopted in the manufacture of cigarettes, but the fumes given off by this method cannot well be inhaled as they are more or less irritating to the mucous membrane. There is one material which may be used instead of paper for treatment with solutions, and this is the fine wool obtained from peat. It is true that the leaves of many plants may be moistened with solutions, dried, and then burnt slowly. For example, if the leaves of stramonium are moistened with an aqueous extract or tincture of opium fumes are obtained containing the active properties both of stramonium and opium. The leaves of various species of mint yield fumes which can be inhaled without irritation, just as is the case with the pure leaves of tobacco.

In the *Materia Medica* of the Hindus¹ mention is made of "Dhumapāna or Inhalations." It is stated that "tapers or pastilles made of medicinal substances are set fire to and their fumes inhaled through a tube by the mouth or nose," and that "incenses or tapers composed of various medical substances are also burnt in rooms." It seems, indeed, that the inhalation of fumes is a method of treatment of ancient date, and it is reasonable to think that the practitioner might avail himself of it at the present time with all the assistance given by advance of knowledge. To enter into details, however, is not the intention of the above remarks, which can only be regarded as an introduction to the consideration of a subject of great therapeutic interest.

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THE PRODROMAL ERUPTIONS OF SMALL-POX.

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As so much attention is directed to the subject of small-pox at the present moment, the following note on the rashes met with in the initial stages of the disease may prove of interest.

Initial rashes were present in 25 of 220 cases which passed through my hands in the Bradford Borough Small-pox Hospital in the winter of 1893-1894, forming about 11 per cent. of the total cases. These eruptions, which take the form of an erythema or of subcutaneous hæmorrhage, are said to appear on the day preceding or on the same day as the papules of the characteristic eruption. Though described as being of but short duration I found them still present as late as the sixth, seventh, and eighth days of illness, the

erythematous form, curiously enough, proving the more persistent. In several cases both erythema and hæmorrhage were met with at the same time. The erythema resembled the eruptions of measles and scarlet fever and was present in 10 cases. The measly form was usually fairly copious in amount, the arms being the favourite site, less frequently the trunks and legs, while the face was but once the seat of the eruption. The scarlatinal variety was most frequently found on the abdomen. The most pronounced case presented two complete zones round the shoulder and pelvic girdles united down the flanks. These erythematata faded to a dull yellow after two or three days, and finally disappeared from the fourth to the ninth day of illness. Elevation of the eruption was never observed and thus a strong point of difference was presented from the eruption of measles and from certain toxic rashes characterised by infiltration into the skin. Any appreciable resemblance to erysipelas was not observed. Subcutaneous hæmorrhage occurred in 18 of the 25 cases, taking the form of numerous petechiæ confined to a comparatively small area of the skin and thus differing in distribution and form from the subcutaneous hæmorrhages of hæmorrhagic small-pox which are individually much more extensive and are generally distributed. The deep purple or black hue of the latter variety was never attained to. While the lower part of the abdomen and the inner aspect of the thighs were the areas most frequently selected hæmorrhage was also to be seen in various situations on the trunk and on the upper arms. It was never met with below the elbows or knees or on the face. The latest date at which petechiæ were still recognisable was the seventh day of illness, careful distinction being made between the initial hæmorrhage and that which may make its appearance later in the course of the illness. These initial rashes appeared to favour no particular age-period, being met with anywhere between the ages of seventeen and forty-eight years. A remarkable point was their relative incidence on the vaccinated and unvaccinated, 23 of the 25 cases having been primarily vaccinated. The proportion in percentage of the vaccinated to the unvaccinated among those showing these eruptions was thus 92 to 8. This was not due simply to the excess of primarily vaccinated cases in the hospital, for their proportion of the total cases was not more than 70 per cent. The occurrence in vaccinated cases being so notable it was natural to look for distinctly favourable results from the collective cases, and this expectation was fully justified. Apart from any consideration of this kind, however, where erythema was present there was a very distinct relation observed between the prodromal rash and the true eruption which materially influenced the progress of the case. The papular rash either did not develop at all on the erythematous areas or did so to a very scanty degree, and as these areas were usually extensive the cases were thus of a mild type. This relation was shown from the opposite point of view in a case where the prodromal eruption was scanty and the true eruption was elsewhere copious. The termination was, however, favourable as in all the erythematous cases. It was somewhat different when hæmorrhage was present. As the parts where they usually appeared were the groin and the lower part of the abdomen, where the characteristic papules were least frequently seen, no influence on the true eruption could thus be said to be exercised. Thus among these cases a severe type of the disease preponderated, but in no case did the illness terminate fatally.

BIRKENHEAD MEDICAL SOCIETY.—The seventh and last monthly meeting of the session was held in the society's library on May 8th. Due notice having been given the two following resolutions were considered and carried, the first unanimously and the second with two dissentients: 1. That in the opinion of this meeting it is unprofessional for medical men to serve any medical aid society in which touting is carried on, in which there is no wage-limit, and where money is funded by the society at the expense of the medical staff. 2. That in the opinion of this meeting the members of this society should refuse professional recognition of "sixpenny doctors" whether by meeting them in consultation or otherwise. The mover of the second resolution gave the following definition of "the sixpenny doctor"—viz., a medical man who openly or otherwise lets the public know that he will give them advice and medicine for sixpence, and will visit them for one shilling; or any medical man who has in that way commenced his practice.

¹ Uday Chand Dutt, Calcutta, 1877, p. 20.