If the ribs are hard, as in elderly persons, they are more liable to fracture. If they do not fracture, on account of their hardness, a large part of the force applied is conducted through their substance to the detriment of the lung. If they do fracture, the force producing this result is saved from the lung.

It may thus happen that a greater fall may be less dangerous than a lesser one, for, if the fall be just sufficient to break the ribs, but little force will pass through them and there will be less danger to the lung. On the other hand, if the fall be just not sufficient to fracture the ribs, a large part of the force accrued by the fall will pass through the chest wall and there is danger of contusion of the lung.

These results appear to be in agreement with clinical observation, fatal contusion of the lung being of more frequent occurrence in elderly than young persons.

It is needless to say we are not here considering those cases in which the substance of the lung is penetrated by a fractured rib.

Space will not allow me to discuss fully the interesting question whether the consolidation found in cases of contusion of the lung is identical with that of ordinary croupous pneumonia. I will content myself by stating that there are two opinions on this point. The first is that the portion of the lung contused is rendered a suitable nidus for the pneumococcus, and that ordinary pneumonia results. The second is that the solidification is simply due to the coagulation or "organization" of the blood poured into the air cells as the result of the contusion. As Hamilton⁴ says: "It must be remembered that there are pneumonias and pneumonias; that a croupous exudate may be poured into the lung through a multitude of exciting agents, and may even result from purely mechanical causes which lead to embarrassment of the pulmonary circulation."

REFERENCES.

¹ *Textbook of Pathology*, vol. ii, p. 102. ² *Medical Jurisprudence*, p. 392, Ed. 1844. ³ *Kirk's Physiology*. ⁴ *Loc. cit.*

A NOTE ON BODY-WEIGHT IN RELATION TO PULMONARY TUBERCULOSIS.

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It is generally acknowledged (and to some extent acted on in regard to life assurance) that, both in families in which there is supposed to be a predisposition to tuberculosis and in those in which there is none, the overweight members are less likely to develop consumption than the underweight members. C. L. Greene¹ quotes the combined experience of the Washington and National Life Assurance Companies (3,548 cases), showing that in persons apparently without special predisposition to consumption the percentage of deaths from consumption was 5.20 for weights above the standard, 15.67 for standard weights, and 24.20 for weights below the standard; whilst in persons supposed to have a predisposition to consumption the percentage of deaths from consumption was 5.59 for weights above the standard, 25.91 for standard weights, and 42.51 for weights below the standard. Greene² likewise quotes the experience of the Connecticut Mutual Life Insurance Company (1846 to 1895 inclusive), showing that the percentage of deaths attributed to tuberculosis was 22.0 in underweights and only 1.9 in overweights.

C. Muirhead, when studying the causes of death among the assured in the Scottish Widows' Life Assurance Society (1874 to 1894 inclusive), looked up the height and weight as tabulated on admission into the life assurance society (1) of 524 males who ultimately died of pulmonary tuberculosis; (2) of 502 who were said to have died of "apoplexy." Amongst those who died of apoplexy, 59.87 per cent. weighed, on admission for life assurance, above the normal standard for their height and age (as calculated according to Dr. W. Robertson's standard table),

and 40.13 per cent. weighed below the standard; whilst of those who ultimately died of pulmonary tuberculosis only 19.30 per cent. weighed on admission above the standard, the large proportion of 80.70 per cent. weighing below the standard.*

We wished to ascertain as far as possible what the average weight of consumptive patients in a large hospital for consumption was (1) in comparison to their height and (2) in comparison to the average of their former ordinary weights.

In the Mount Vernon Hospital for Chest Diseases it is the rule to enter the height and weight of every patient on admission, and likewise to note what the former ordinary weight was whenever information on that subject can be obtained.

We determined, therefore, with the consent of the medical staff, to collect these data from cases in which the former ordinary weight was mentioned.

(A) In a series of 500 male patients 25 years old and upwards, all of whom had tubercle bacilli in their sputum, we found that the average height was exactly 5 ft. 7 in.; that is, the figure obtained by adding together the heights of all the patients, as entered in the notes on admission, and dividing by 500. Their average weight on admission, obtained in the same way, was 9 st. 1 lb. 13 oz.; 53 of them (10.6 per cent.) weighed more than 10½ st., 3 (0.6 per cent.) weighed exactly 10½ st., and 444 (88.8 per cent.) weighed less than 10½ st. The average of their former ordinary weights was 10 st. 5 lb. 9 oz.; 204 of them (40.8 per cent.) used to weigh more than 10½ st., 16 (3.2 per cent.) used to weigh 10½ st., and 280 (56.0 per cent.) used to weigh less than 10½ st. It seems, therefore, that the average of the former ordinary weights of these male patients (presumably their weights as far as they knew before their illness) was below standard, though of course not so decidedly "underweight" as their average weight on admission was.

(B) In a series of 100 female patients 25 years old and upwards, all of whom had tubercle bacilli in their sputum, we found that the average height was exactly 5 ft. 3½ in.; that is, the figure obtained by adding together the heights of all the patients, as entered in the notes on admission, and dividing by 100. Their average weight on admission, obtained in the same way, was 7 st. 9 lb. 13 oz. Eighteen of them weighed more than 8½ st., 1 weighed exactly 8½ st., and 81 weighed less than 8½ st. The average of their former ordinary weights was 8 st. 8 lb. 12 oz. Fifty-four of them used to weigh more than 8½ st., 1 used to weigh 8½ st., and 45 used to weigh less than 8½ st. It seems, therefore, that, though the average weight of these female patients on admission was much below standard, the average of their former ordinary weights (presumably their weights as far as they knew before their illness) was scarcely below standard, certainly not so "underweight" as that of the male patients (Series A).

(C) We likewise collected similar data from a series of 100 male patients in their 30th year or upwards, who whilst they were in the hospital presented undoubted physical signs of old pulmonary tuberculosis, though they had no fever and no tubercle bacilli in their sputum (patients in whom, in fact, the tuberculosis appeared to be quiescent or not very active). Their average height was 5 ft. 6½ in. Their average weight on admission was 9 st. 7 lb. 5 oz. Twenty of them weighed more than 10½ st.; 3 weighed exactly 10½ st.; and 77 less than 10½ st. The average of their former ordinary weights was 10 st. 6 lb. 11 oz.; 48 of them used to weigh more than 10½ st., 1 used to weigh 10½ st., and 51 used to weigh less than 10½ st. It seems, therefore, that the average weight in this series of male patients on admission and the average of their former ordinary weights were both below standard, but not so much so as in the series of male patients (Series A) showing signs of active pulmonary tuberculosis and having tubercle bacilli in their sputum on admission. This may be taken, perhaps, to signify that a generally more robust habit of body accompanied their resistance towards tuberculosis, a resistance shown by the relative quiescence of the disease.

Probably the preference shown by pulmonary tuberculosis for "underweights" would have been more strikingly illustrated by our cases had it not been that

* See C. Muirhead, *The Causes of Death among the Assured in the Scottish Widows' Fund*, Edinburgh, 1902, p. 44.

	Average Height on Admission.	Average Weights on Admission.				Former Average Weights.			
		Average Weight on Admission.	Percentage above 10½ st. in Males, 8½ st. in Females.	Percentage exactly 10½ st. in Males, 8½ st. in Females.	Percentage below 10½ st. in Males, 8½ st. in Females.	Average of Former Ordinary Weights.	Percentage above 10½ st. in Males, 8½ st. in Females.	Percentage exactly 10½ st. in Males, 8½ st. in Females.	Percentage below 10½ st. in Males, 8½ st. in Females.
500 male patients, 25 years old and upwards, all with tubercle bacilli in their sputum	ft. in. 5 7	st. lb. oz. 9 1 13	10.6	0.6	88.8	st. lb. oz. 10 5 9	40.8	3.2	56.0
100 female patients, 25 years old and upwards, all with tubercle bacilli in their sputum	5 3½	7 9 13	18.0	1.0	81.0	8 8 12	54.0	1.0	45.0
100 male patients, in their 30th year and upwards, with physical signs of old pulmonary tuberculosis, but without fever and without tubercle bacilli in their sputum	5 6½	9 7 5	20.0	3.0	77.0	10 6 11	48.0	1.0	51.

consumptive patients, on admission to hospitals, when the case notes are being taken, are inclined to exaggerate their loss of weight—that is to say, there is a tendency for them to overestimate their former ordinary weight.

Our results have been classified in the accompanying table.

REFERENCES.

¹ *Medical Examination for Life Insurance*, London, second edition, 1905, p. 365. ² Loc. cit., p. 129.

ASTHMA: ITS CAUSATION AND TREATMENT.*

By WILLIAM LLOYD, F.R.C.S.Ed.,

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AMONG the various chronic complaints to which the human frame is liable, very few can be considered of a more formidable nature than a confirmed asthma. The idea of its being an incurable disorder, its threatening instant suffocation at every attack, are circumstances altogether so alarming to a patient as necessarily to weaken and depress a mind endowed with the utmost fortitude and resignation. Any remedy, then, whether medicinal or surgical, that is capable of administering permanent relief to a person in such an afflicting situation, must be looked upon as of the utmost importance to mankind.

It may be stated that to-day a radical cure can be promised in a large percentage of cases, especially if asthma is treated in its early stages; of the remainder a number can be relieved altogether for the time, though they may be subject to subsequent attacks.

CAUSATION.

Although it would be idle to deny that the seeds of asthma are sometimes transmitted from parents to their offspring, yet too much pains have been taken by past writers to persuade the world that this is most commonly the case.

This opinion, as far as I am able to judge, was founded on the inefficacy of the remedies generally employed, rather than on the more faithful and unerring testimony of observation. Physicians supposed, as the disorder seldom or never yielded to the power of medicine, that some hidden and unconquerable cause had fixed its roots deep in the constitution, and as an apology for the healing art they have thought proper to charge this to the account of an hereditary taint. Happily, however, we know that in the large majority the case is otherwise. As an example of the hereditariness of the disease I will describe an interesting case that came under my notice in the summer of last year.

A lady consulted me in June, 1907, and brought her eldest son, who was 22 years of age, suffering from asthma. The family history is briefly as follows: Mrs. E., the mother, aged 51, married twenty-seven years ago, her husband being typically asthmatic. Two children were born of this marriage, both boys. Asthma in each case commenced at two years of age. The father died when the eldest boy was 7 and the youngest 5 years of age. Two years later the mother married again, this time not to an asthmatic. Of this marriage there are three children, the eldest being in his 16th year, perfectly free from any suspicion of asthma.

* Read before the Chelsea Division of the British Medical Association.

From this fact (if a solitary case can have any weight) it may be inferred that the predisposition is inherited.

There are numerous theories as to the causation of asthma, but, in my opinion, the only one which can be successfully maintained in the present state of our knowledge is the following: That asthma is essentially a nervous disease, and that it is due to spasm of the bronchial muscles, induced reflexly either by irritation of the nasal mucous membrane or of the alimentary canal.

To state my point clearly, take a case of asthma of nasal origin (fortunately they are the commonest), wash the patient's nose out with a mild antiseptic lotion—boracic acid, for instance—and in ninety-nine cases out of a hundred you will produce an attack of asthma, which is immediately cut short on the application of a 10 per cent. solution of cocaine to the nasal septum in the region of the anterior end of the middle turbinate. In cases of hay asthma and ipecacuanha asthma, the excitant of the paroxysm is something applied to the nasal and not the bronchial mucous membrane. Of this fact I have convinced myself by a simple experiment. Plug the nostrils, and allow the patient to inhale pollen or ipecacuanha through the mouth, and invariably he remains free from any suspicion of asthma.

It would appear, then, that there are three factors in the causation of asthma, namely:

1. The presence of hypersensitive areas in the nasal mucous membrane, or a special sensitiveness of the gastric mucous membrane.

2. A special irritability of the pulmonary nervous system, which constitutes the asthmatic idiosyncrasy with which the individual was born.

3. The presence of an irritant—for example, odours, dust, smoke, etc. Error in diet when of gastric origin.

The absence of any one of these factors is sufficient to prevent the disease.

TREATMENT.

The remedies that have been generally made use of in this disease are of great variety, such as expectorants, antispasmodics, etc.; but, like that of all paroxysmal affections, it naturally divides itself into the treatment of the paroxysm and the treatment in the intervals.

The first thing to be done on being summoned to a patient in an attack of asthma is to find out if there is any exciting cause present, and if so to remedy it. Inquire as to the time and digestibility of the last meal, and if his bowels are free and regular; if there be any source of trouble in the stomach or rectum, secure its immediate removal. If there is anything irritating in the air he is breathing, arrangements must be made for removal. If the patient is in bed, get him out and bolster him up in an arm-chair, place before him a table with a cushion on it, on which he may rest his elbows and throw himself forward.

Should the paroxysm persist in spite of these measures, then one of the following remedies must be administered in the hope of cutting it short. I have occasionally found ipecacuanha powder cut short an attack for the rest of the night. The use of pipe tobacco smoking acts admirably in some patients. It must be remembered that remedies of this kind must be given as early as possible, because