preventive or restorative. Neither can amount to much in atrophies and lost function resulting from faulty innervation and cord involvement, where local measures are useless, and the treatment of the disease, whether medical or surgical, too often equally so. Cases of syphilitic origin, however, carry a somewhat more favorable prognosis. But prevention or restoration may accomplish much in cases arising from the other causes mentioned, especially the traumatic.

The minimizing of all trauma is the first necessity. Many of the common obstetric injuries are in part avoidable. But the necessity for severing one or both sphincters in fistula operations and the tedious granulation process following, are one of the most prolific causes of later muscular degeneration. The most crying need in rectal surgery is for some really practical operation that will do away with the necessity for sphincteric incision. Various procedures have been proposed to this end, but none are free from objection. One of the most feasible is the recently published⁴ method of Elting's, whereby he adapts the Whitehead operation to the purpose.

Given the muscular trauma, the next necessity is immediate and accurate repair, to forestall the inevitable result of partial disuse and atrophic structural change. Otherwise later attempts at restoration are difficult or futile with the shrunken materials available.

Given unrepaired trauma and much structural loss of the peri-anal muscles, the problem of securing continence is one either of restoration or of substitution of other structures for the damaged muscles. They must be recognized and approximated as closely as possible; but, practically, in all such surgery we depend for much of our result on cicatricial contraction of the parts united, producing a partial stenosis of the anal canal. This with the little that may be left of the internal sphincter gives the only substitute that can be had for the normal unconscious control of that muscle.

The loss of voluntary control is met by a similar use of cicatrix and attenuated external sphincter. But if that muscle be wanting, resort must be had to substitution, and in this way much can be done by close approximation of the levators. Even in the almost complete absence of sphincteric substance in congenital common recto-vaginal orifice, very satisfactory control has been given by utilizing this principle. Tuttle recounts⁵ the operation of Chetwood, which uses strands of the gluteus maximus from each side to cross and surround the anus. Data are wanting of the successful employment of this ingenious plastic work: and indeed in five cases so operated by that surgeon, Lynch states⁷ that the results were definitely unsatisfactory.

There remains the question of the restoration of sphincters attenuated by long continued di-

vulsion by chronic protruding piles or prolapse. With such sphincters the recurrence of hemorrhoids even after thorough removal is very common. The muscles may give fair fecal control but do not afford sufficient support to prevent the natural tendency to outward protrusion of the hemorrhoidal zone. Faithful voluntary exercise of the muscles of the pelvic diaphragm and faradism seem to restore some of the tone to the enfeebled muscles. And every effort must be made to increase the patient's general weight, and thereby the amount of perianal fat which helps so much to support the anal walls. Surgically it may be possible to shorten the muscle under cover of a dissected-up flap of anal mucosa, but the value of this is doubtful.

The prognosis in all cases of sphincteric deficiency is somewhat uncertain; and the elements that make for that uncertainty are varied and the information considerably scattered. Some of this discussion may have been trite to you, who are daily doing rectal work, but we hope that it may have summarized in a way useful to the general practitioner the facts in regard to this very troublesome phase of his occasional proctologic work.

REFERENCES.

- ¹ Hertz: *The Sensibility of the Alimentary Canal*, p. 35.
- ² *Ibid*, p. 15.
- ³ Starr: *Nervous Diseases, Organic and Functional*, p. 181.
- ⁴ Sahli, p. 1167, quoting from L. R. Müller, *Zeit. für Nervenheilk.*, vol. xxi, parts 1 and 2.
- ⁵ Elting: *Annals of Surgery*, November, 1912.
- ⁶ Tuttle: *Diseases of Anus, Rectum and Pelvic Colon*, p. 417.
- ⁷ Lynch, J. M.: *Personal Statement*.

THE RÔLE OF "FAMILY CLUSTERS" IN THE PREVALENCE OF PULMONARY TUBERCULOSIS.

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IN reviewing the records of 1300 admissions to the North Reading State Sanatorium in the three and a half years of this institution's existence we have found therein an interesting study in data relating to the pedigrees of certain cases. We have learned that in 134 distinct examples there occurred the incidence of at least three cases of pulmonary tuberculosis in a single family. These groups of infected people we have designated as "Family Clusters."

That we must expect to find tuberculosis occurring in more than one member of the same family is not strange, but that we should find so many almost identical instances in a little over one thousand cases does seem worthy of attention.

The late E. G. Pope of Saranac Lake in Draper's Memoirs stated¹ that: "When an infectious disease is as widely prevalent as tuberculosis we must expect to find frequently several members of the same family, household or workshop dying from the disease without taking into account either heredity or direct infection as causative factors. Where, for instance, one person in every ten dies from tuberculosis, if we take one hundred families, or groups of five persons each, we shall expect on the doctrine of chances to find two or more members thus dying in each of eight groups out of one hundred groups simply as a result of a chance distribution of the disease."

Giving all possible credit to the strength of Mr. Pope's deductions we are led to believe that it is possible to lower the one in ten mortality rate by breaking up these centres of malignant influence wherever such action is possible.

We are not prepared at the present to enter upon a dissertation to the effect that the accompanying data prove conclusively the existence of a definite quantitative intensity of inheritance of the tubercular diathesis. That they do favor such a belief seems a well-warranted assumption, and this assumption tempts a further investigation of our own, together with other collateral data, to establish proof if possible. But having the greatest respect for the ideas of Prof. Carl Pearson regarding the requirements² for a complete inquiry into the problems of inheritance of any character, we cannot, without further search, including the perusal of general hospital statistics, discuss the question of hereditary influence as affecting the multiple incidence of phthisis in the same family, as appearing in the "Clusters."

A study of these family groups, as shown on the annexed charts, would lead us to believe that the domiciliary distribution of tuberculosis may be due wholly or in part to the establishment of foci of infection following carelessness of individuals, usually adult open cases with the disease. The swiftest channels for spread of disease and for furtherance of its activity is through the family lines.

Some authorities³ propose that tuberculosis is not as a rule contracted in adult life and that the infection is established in children, to be manifested by disease activity as the stress of later responsibilities of adult life wears down the resistance. One may note upon the accompanying charts that infection was present in the patient's family years before he came down with the disease, and that when the patient was two years of age, for instance, his mother was dying with tuberculosis; in such cases the whole family was probably closely housed and all subject to exposure.

On the other hand, there is quite regularly admitted to this sanatorium a patient whose brother, sister, or conjugal partner has been a patient here or in some other sanatorium, or at

any rate has been a victim of the same disease, where the source of infection seems easily traced, and the origin of the patient's morbid condition of recent happening.

In this instance we cite the case of a patient we have just admitted. He stated that to the best of his knowledge there had been no tuberculosis in his antecedents or immediate family until four years ago, when a brother became ill with that disease and died after a year's residence with the family. During his period of illness he was careless, and spent much of his time when able to be out, in dissipation, often bringing home convivial companions, one of whom was a particular friend and also afflicted with tuberculosis. Since the death of this brother three other members of the family have come down with the disease, two of whom have died within a year of each other. Through the means of this family the disease was perpetuated, in part, by carelessness on the part of the patient and by close association between all members of the family circle.

The lack of prophylaxis in the home is not entirely eradicated by a residence in a sanatorium, as we have lately learned through one of our patients returning from a short leave of absence, that a former patient who had had the benefit of sanatorium instruction, was then living in the same room with his family, consisting of his wife and four children, and that he was in the habit of expectorating freely upon the floor. Heedless of his teaching to the contrary, he was entirely neglecting the proper laws pertaining to the care of virulent sputum, particularly where his own children were exposed. A visiting nurse later confirmed this account.

Thus, through the laxity of this ex-patient's habits a new focus of infection is set up, about which we find clustered four susceptible children and the hard working and ill nourished mother. By such of these too many instances will the morbidity rate of the near and distant future years receive its acceleration.

The two section diagrams exhibited herewith need but little comment, we hope, for they are so drawn as to offer the reader opportunity to scrutinize the data *en masse* and to appreciate the significance of the family cluster factor in the spread of tuberculosis. It should be kept in mind that the patient whose age at time of admission to the hospital is given in a column headed "Patient's Age" always makes up another number in the cluster. Again, the columns 0 to 10, 10 to 20, etc., etc., located to the right of the relative's name, include the number of years since that relative died of tuberculosis. Many times no record is found in the histories of the time when decease took place, hence the column "No record." In some of the cases tabulated it should be noticed how the disease has run along in the same family year after year, one member apparently handing on the infection to the next member.

[illegible]

Even though there is an apparent lapse of time in some cases between the death of one number of the cluster and the breaking out of disease in the next number, yet the deadly certainty with which the disease recurs excites inquiry for an infection maintenance factor other than that afforded by direct association with the active case. Much added interest would have been obtained in securing data concerning whether or

not the family continued living in the same house, but none were generally available. Only occasionally do we find it recorded that the family had occupied the same domicile for a considerable number of years, or perhaps to this effect, "Family moved into house sixteen months ago which had been used by a consumptive and not fumigated."

The evidence is more circumstantial than di-

SECTION OF DATA FROM 1300 CASES. 1913. COMPILED BY DR. N.B. BURNS.										"FAMILY CLUSTERS" IN T.B. PREVALENCE NORTH READING STATE SANATORIUM										FEMALE PATIENTS. DRAWN BY E.L. BOUVE										1913									
PATIENTS AGE	RELATIVE HAVING TUBERCULOSIS	LIVING WITH T.B.	NO. OF YEARS DECEASED					PATIENTS AGE	RELATIVE HAVING TUBERCULOSIS	LIVING WITH T.B.	NO. OF YEARS DECEASED					PATIENTS AGE	RELATIVE HAVING TUBERCULOSIS	LIVING WITH T.B.	NO. OF YEARS DECEASED																				
			0 TO 10	10 TO 20	20 TO 30	30 TO 40	40 TO 50				NO RECORD	0 TO 10	10 TO 20	20 TO 30	30 TO 40				40 TO 50	NO RECORD	0 TO 10	10 TO 20	20 TO 30	30 TO 40	40 TO 50	NO RECORD													
48	FATHER MOTHER BROTHER " SISTER HUSBAND	• • • • • •		• • • • • •			31	BROTHER SISTER HUSBAND FATHER BROTHER " SISTER MOTHER BROTHER SISTER " CHILD	• •<																														

is greatly aided by the tendency of a family to reside in what is virtually a pest house year after year; and to remain closely housed with each other, sick and well alike, indifferent to the consequent dangers, the healthy members exposing themselves to direct infection afforded by the sickened "don't care," negligent consumptive.

We do not intend to propose positive remedies or to make fanciful suggestions of a Utopian nature for the eradication of the family cluster evil because it lies too much enmeshed with other social misfortunes to offer one opportunity to isolate and exterminate easily the trouble. Patience and reasoning on the part of those whose business it is to deal with such people will, we believe, accomplish some measure of success in results. As the local health boards probably realize, some stronger power of coercion than moral persuasion is necessary in breaking up family clusters in a great many instances.

At the sanatorium, in the matter of preventive tactics, we come to the point of contact with the family cluster evil in this way: A far advanced consumptive, incurable and hopelessly ill, beseeches his family to take him home. The family, overcome with sympathy and fraternal pity, are inclined to accede to the patient's wishes, even though they have scant means with which to care for him properly at home, and what is most important, no safe place to house him in such a way as to preclude danger of contaminating the several young children of the family. If the family is patiently remonstrated with and if they can be impressed with the full significance of the family cluster danger, viewing the diagrams such as are shown herewith, we may meet with some success in preventing a further extension of phthisis in their midst. Oftentimes this action brings forth a storm of protest from the patient, who sees his plans frustrated, and immediately directs a tirade of abuse and fabrication against all parties connected with the institution, making up false stories of all sorts in the hope of arousing the relative's indignation. There is no limit to the amount of calumny heaped upon us by such an individual. But we feel that the good accomplished in keeping from that family an infection focus, more than offsets our trouble. Furthermore, we believe that we are exercising our good offices in so doing, for, according to our observations and conclusions, we are thus preventing the formation of what

would otherwise be still another "Family Cluster."

REFERENCES.

- ¹ Draper's Research Memoirs, Marital Infection. Dulau and Company, London.
- ² Pearson: British Medical Journal, May 27, 1905.
- ³ Bailey: Journal of Outdoor Life, May, 1913.
- ⁴ Medical Notes: BOSTON MEDICAL AND SURGICAL JOURNAL, Jan. 23, 1913.
- ⁵ Rapport a M. Le Préfet sur les Recherches effectuées au Bureau du Casier sanitaire pendant l'année 1911 relatives à la répartition de la tuberculose et du cancer dans les maisons de Paris. Département de la Seine.

DIAGNOSIS OF TYPHOID FEVER ON ADMISSION TO A HOSPITAL.

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THE importance of promptly recognizing typhoid fever after admission to a hospital can hardly be questioned. It is the rule at the Massachusetts General Hospital that cases in which the diagnosis of typhoid fever seems clear shall be put at once on "enteric precautions," and that for other cases in which typhoid is suspected "special enteric precautions" shall be ordered, pending a diagnosis.

Certain utensils are reserved for typhoid patients, and those on "special enteric precautions" have other utensils reserved for the individual. Thus, exposure to typhoid is avoided when the diagnosis is doubtful, and at the same time other non-typhoid patients are protected from possible danger.

After admission to the hospital, patients are examined by the senior house-officer in charge of the service before they are seen by the visiting physician. It is the duty of the house-officer to prescribe preliminary treatment, and he is expected to order suitable precautions, when indicated, whatever may have been the diagnosis made outside the hospital.

Being desirous of obtaining information as to the signs most to be relied on for the diagnosis of typhoid under these circumstances, the writers tabulated facts from the records of the

TABLE I.

Temperatures F.	Typhoid Cases.	Non-typhoid.	Pulse.	Typhoid.	Non-typhoid.	Respiration.	Typhoid.	Non-Typhoid.
a. Below 100°	6%	18%	a. Below 70	3%	3%	a. 15-20	5%	2%
b. 100°-101°	5%	17%	b. 70-80	4%	4%	b. 20-25	48%	52%
c. 101°-102°	17%	22%	c. 80-90	15%	16%	c. 25-30	30%	21%
d. 102°-103°	25%	27%	d. 90-100	29%	18%	d. 30-35	12%	18%
e. 103°-104°	27%	12%	e. 100-110	24%	32%	e. 35-40	5%	6%
f. 104°-105°	16%	3%	f. 110-120	16%	15%	f. 40-+	0	1%
g. 105°-105.2°	4%	1%	g. 120-130	9%	11%			
			h. 130-140	0	1%			