sub-aquatic birds, and sometimes small mammals) from bathing areas or by destroying the intermediate hosts (snails). The exclusion of birds and mammals from bathing areas presents obvious and often insuperable difficulties. Snail control is also extremely difficult, though considerable reduction can sometimes be achieved by hand-picking. Copper salts have often been recommended for killing snails, and in the hands of some investigators have apparently yielded good results. However, unless used with caution, copper sulphate, which is the copper salt most frequently used, may cause damage to the fish. Frequently the most simple solution is in the exclusion of bathers from the infected areas.

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RÉSUMÉ

La dermatite causée par le schistosome cercariae, mieux connue sous le terme de "démangeaison des nageurs" est habituellement rare dans l'est du pays et plus commune dans l'ouest, c'est pourquoi la découverte récente d'une zône d'infestation aux environs de Montréal, longtemps insoupçonnée, ajoute de l'intérêt à cette question.

Cliniquement cette dermatite offre des lésions cutanées variant de l'érythème simple à de grosses papules rouges et extrêmement prurigineuses. Typiquement il existe une sensation de prurit initiale durant le contact à l'eau; cela coïncide avec la pénétration des cercariae dans la peau. L'éruption commence à s'amender vers le cinquième jour pour disparaître en une semaine.

Cette dermatite est un phénomène de sensibilisation. Il a été prouvé en effet qu'un contact initial ne résulte pas en une dermatite, et ce n'est qu'après qu'un individu a été sensibilisé qu'il verra apparaître l'éruption.

Il n'est guère de mesures prophylactiques contre cette infection, si ce n'est que de détruire totalement tous les colimaçons, qui semblent être les hôtes intermédiaires les plus usuels. Cependant, un vigoureux frottage du corps avec une serviette rude immédiatement après la sortie de l'eau détruira presque tous les cercariae avant qu'ils ne pénètrent la peau.

THE LARYNGEAL SWAB SPECIMEN IN THE CULTURAL DIAGNOSIS OF PULMONARY TUBERCULOSIS

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FOR A NUMBER OF YEARS it has been accepted sanatorium practice to culture gastric aspirations when investigating patients without sputum, or whose sputum has been culturally negative for tubercle bacilli on previous occasions. The gastric specimen has been shown by several investigators to be superior to other material. Results of studies conducted in this laboratory in 1939[1] were in agreement with this contention. The value of the procedure is limited by the discomfort occasioned to the patient and the time taken to obtain the specimen.

As early as 1905, Blume[2] used laryngeal swabbing to obtain material for direct smear examination for acid fast bacilli. Subsequently Grass,[3] 1931, employed laryngeal swabbing with success for cultural diagnosis in open cases of tuberculosis. Later Dornickx,[4] 1937, Benzançon *et al.*[5] 1937, Böhm and Ekstein,[6] 1938, obtained satisfactory results in patients who did not expectorate. The first report in English on the subject was that of Nassau,[7] 1941, who was able to secure a high percentage of positive cultures from patients discharged from a sanatorium in England. The method was studied by Hounslow and Usher,[8] 1948, who actually compared the laryngeal swab specimen with gastric lavage and concluded that the results of three consecutive laryngeal swabs are as good as, and probably better than, a single gastric lavage. Simultaneously Forbes *et al.*,[9] 1948, reached similar conclusions. In Canada, Duggan and Delamater,[10] 1950, compared gastric specimens with laryngeal swabs in 100 consecutive cases and concluded that two, or preferably three cultured swabs are as accurate as a single gastric lavage. All investigators have been unanimous in concluding that the swabbing procedure is less unpleasant for the patient and an easier one for the technician.

The English publications, together with discussions with several visiting British phthisiologists, aroused our interest in the subject. We were skeptical of the results, since we were not entirely satisfied that the techniques employed for handling the gastric lavage by the other investigators were the best available, and might therefore produce fewer gastric positive cultures than we would have obtained. It is well known that some gastric juices are lethal to tubercle bacilli, particularly when the material is not refrigerated or neutralized immediately. The practice in this institution has been to receive the lavage material directly into tri-sodium phosphate,[11, 12, 13] which preserves the viability of the organisms, and it was felt that, in some instances where this was not done, there may have been loss in viability. If this was the case it would give an apparent advantage to laryngeal swab specimens, since in them there is no gastric juice to kill the organisms.

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It also occurred to the author that the laryngeal swab would be particularly well adapted to fluid culturing, since the amount of sediment involved would be very small and that conversely it might be possible to show the swab up even more favourably. It was, therefore, decided to reassess the value of the swab specimen by comparing 1,000 cultured fasting gastric juice samples with 1,000 triplicate laryngeal swab specimens subjected to liquid culturing. The swabbing was to be done in triplicate, since other investigators had mentioned the figure of three laryngeal swabs for each gastric. The value of the swab at a chest clinic was also considered worthy of study.

MATERIAL

The lavage material and the swabs for the comparisons were secured from patients for whom gastric lavage had been ordered as a hospital routine. On the morning of the lavage a swab was also taken. Two other swabs were made: one on a day prior to gastric lavage; another on a day after. As a rule these swabs were done within one day of the lavage, but in some instances the time was somewhat greater. It was never longer than three or four days, the entire collection being completed within seven days.

While the laryngeal swab taken on the day of the gastric lavage was obtained in the fasting state, no effort was made to do this with either of the other two swabs taken. Sometimes they happened to come before breakfast, but at others they were secured at different periods of the day.

In all, 1,024 comparisons were set up and this report deals with 967 of these which were brought to completion without contamination having occurred in the lavage cultures or in any one of the three laryngeal cultures (49 laryngeal swab cultures out of a total of 3,072 were contaminated—1.6%).

These 967 comparisons (967 gastric lavages; 2,901 laryngeal swabs) were done on a total of 475 patients. Of these patients, 178 were used for comparison tests once, 183 twice, 65 three times, 30 four times, 11 five times, 6 six times, 1 seven times and 1 ten times.

In addition to the comparison study, 530 swabs were taken on 489 chest clinic patients who were suspected of having tuberculosis, or who were known to have had tuberculosis formerly.

TECHNIQUE

The entire fasting gastric contents were aspirated into an ounce of 10% tri-sodium phosphate (23% $Na_3PO_4.12\ H_2O$). On receipt in the laboratory, more tri-sodium

TABLE I.

A COMPARISON OF THE RESULTS OF CULTURING GASTRIC LAVAGE AND TRIPLICATE LARYNGEAL SWAB SPECIMENS, ALL TAKEN WITHIN A PERIOD OF ONE WEEK

	Swab No. 1	*Swab No. 2*	*Swab No. 3*	*Swab Nos. 1 and 2*	*Swab Nos. 2 and 3*	*Swab Nos. 1 and 3*	*Swab Nos. 1, 2 and 3*
Gastric − swab −.....	804	812	814	775	778	788	763
Gastric + swab +.....	56	67	67	77	77	83	84
Gastric + swab −.....	43	32	32	22	22	16	15
Gastric − swab +.....	64	56	54	93	90	80	105

The figures in the first three columns refer to the number of comparisons between the gastric and the particular swab indicated at the column head. In the case of the other columns, they refer to comparisons between the gastric and the group of swabs shown at the column head, any one positive swab constituting a positive for group.

TABLE II.

A SUMMARY OF TABLE I.

	Swab No. 1	*Swab No. 2*	*Swab No. 3*	*Either or both of swabs 1 and 2*	*Either or both of swabs 2 and 3*	*Either or both of swabs 1 and 3*	*Any one, two or all three swabs*
Gastric + regardless of what the swabs were.....	99	99	99	99	99	99	99
Swabs + regardless of what the gastrics were.....	120	123	121	170	167	163	189

These figures refer to the number of positive gastrics or swabs found when the particular swab or group of swabs indicated at the column head were studied, any one positive swab constituting a positive for the group.

phosphate was added, if necessary, to make equal volumes of it and specimen. After 24 hours' incubation at 37°, centrifugation, neutralization of the sediment, the latter was planted on two tubes of Petragnani's medium.[13]

A detailed description of the technique of making and culturing the laryngeal swab has been published elsewhere,[14] but very briefly it consisted of attempting to enter the larynx with a moistened laryngeal swab, at which time the patient coughed on the swab or in some instances had to be asked to cough. The technique obviously constituted a hypopharyngeal swab except in rare instances when the larynx is actually entered. But the misnomer is good in that it keeps before the operator an objective which, when striven for, ensures that a good specimen is secured. The swab was treated with tri-sodium phosphate over night and the neutralized tri-sodium phosphate solution and digested secretion added to a quantity of liquid oleic acid-albumin medium.[15] It was incubated and examined weekly for eight weeks, or until growth had occurred, when it was subcultured to solid medium for confirmation of colony identification. In most instances colony identification was definite in the liquid medium itself.

RESULTS

In 204 of the 967 completed comparisons, tubercle bacilli were grown from either or both the gastric lavage or one of the triplicate swabs. The summarized results are presented in the accompanying Tables I and II. From these it can be seen that even single swabbings were consistently conducive to the finding of more positive cultures than single gastric lavages. Two swabbings were definitely superior to single lavages; three resulted in almost doubling the positive cultures found. Swab No. 2, which was always taken in the fasting state prior to the lavage, was not significantly better or worse than the others. In Table III are shown the findings when comparisons were repeatedly made on one patient. The superiority of the swab is again evident.

TABLE III.

TEN COMPARISONS BETWEEN CULTURED GASTRIC LAVAGE AND TRIPLICATE LARYNGEAL SWABS TAKEN FROM THE SAME PATIENT

Date	*Gastric*	*Swab No. 1*	*Swab No. 2*	*Swab No. 3*
19/6/50	—	+	+	+
26/6/50	—	+	+	+
10/7/50	+	—	—	+
13/7/50	—	+	+	+
22/7/50	—	+	—	+
2/10/50	+	+	+	+
5/10/50	—	+	—	+
12/10/50	—	+	—	+
20/10/50	—	+	+	+
26/10/50	+	—	+	+

Both patients and technicians were in agreement that swabbing is much less of an ordeal than lavaging. However, in the case of children who will not co-operate, it was felt that, if the operator was experienced at lavage, it was still the method of choice, since with a struggling child the swab is of necessity heavily contaminated with mouth secretion.

With regard to the study at the chest clinic, culture demonstrated 15 cases to be bacillary. (Nineteen swabs were positive). The procedure was found well adapted to chest clinic work, and the Director and staff of the clinic were enthusiastic about it. An estimate of the cost of taking and culturing a single swab when large numbers are being routinely processed gave a figure of approximately $1.75. Thus, based on the incidence of the number of positives detected at this clinic, routine swabbing with a similar patient clientele would cost approximately $57.00 for every case found positive. This seems reasonable enough from a public health point of view.

SUMMARY AND CONCLUSIONS

967 comparisons were made between cultured gastric lavage and cultured laryngeal swab specimens taken from sanatorium patients routinely being subjected to gastric lavage.

For each lavage performed triplicate swabs were taken, one on the day of lavage and one on each of a day before and after it, all being completed within a week. The swabs were treated with tri-sodium phosphate and cultured in liquid oleic acid-albumin medium.

Results indicated that under these conditions one swab was a somewhat superior specimen to one lavage; three consecutive swabs were almost twice as valuable in yielding positive cultures as one lavage.

The procedure of swabbing is much easier on the patient and less time consuming for the staff. It is of value at a chest clinic.

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THE CONSERVATIVE TREATMENT OF SINUSITIS*

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THE SIGNS AND SYMPTOMS of acute and subacute sinusitis are so indefinite at times that the infection is often not recognized in the early stages. This is particularly true in children where a postnasal discharge is frequently neglected. Early treatment in these cases would prevent many of them from becoming chronic.

The press and radio suggest cures for sinusitis and at times the family physician mentions "sinus" as the cause of almost any type of headache complained of by the patient. Practically every day rhinologists are consulted by patients complaining of "sinus headaches" when in the vast majority examination shows that the sinuses are free of infection. It has been estimated that of all the various causes of headache less than 5% are due to disease of the nasal sinuses.

The sinuses are air spaces which are outgrowths from the nasal mucous membrane. These evaginations eventually hollow out the bones of the skull and the sinuses thus formed are named after the bones which are invaded. The sinuses or air cavities are variable in number and are divided roughly into an anterior and posterior group. The anterior group are those that open into the middle meatus and comprise the antrum, frontal sinus and anterior ethmoid cells. The posterior group are the posterior ethmoid cells which open into the superior meatus and the sphenoid sinus which opens above and behind, in the sphenoethmoid recess. In other words the anterior group develop from the nasal mucous membrane below the attachment of the middle turbinate and the posterior group from the mucosa above the middle turbinate.

At birth the maxillary antrum and ethmoid cells are present but the frontal and sphenoid sinuses have not yet appeared. The antrum, the sinus most frequently involved in sinusitis, develops early in the fetus and resembles a small bean at birth. It reaches its maximum size about the fifteenth to eighteenth year but is of clinical importance at all ages of childhood and adult life.

The ethmoid cells are nearly all present at birth and occupy their permanent relative position. They vary greatly in number in different individuals. The cells which are formed from the mucous membrane of the middle meatus lie anterior to those which are derived from the superior meatus. Five to ten cells comprise the anterior group and two or three the posterior. These cells grow rapidly and attain their full growth between twelve and fourteen years of age. They are frequently involved in childhood.

The frontal sinus is not present at birth. Within the first few years one of the anterior ethmoid cells invades the frontal bone and at the end of the fourth year the sinus is about the size of a pea. It has little or no clinical significance until the seventh or eighth year.

The sphenoid sinus is not recognizable at birth. A pouch of nasal mucous membrane is present but it has not yet invaded the cartilage or sphenoid bone. During early childhood this cell grows slowly and it does not develop to any extent until the twelfth to the fifteenth year. As a result the sphenoid does not present a problem in early childhood compared with the other sinuses.

In infancy the sinuses are simply outgrowths of the nasal mucous membrane. Therefore infections such as acute rhinitis which affect primarily the nasal mucosa also involve the sinuses. When the acute inflammation in the nose clears up, as a rule the coexisting infection in the sinuses subsides. In childhood the sinus openings are relatively large but as these cavities develop, the openings or ostia become small as compared to the large sinuses. This disproportion in size increases the amount of work necessary for the cilia of the various sinuses to remove infection. This is particularly true of the antrum and sphenoid where the openings are near the roof and are therefore poorly placed for drainage. In spite of this handicap, the millions of closely-packed cilia work efficiently and cleanse the sinuses. They move the overlying travelling belt of mucus which replaces itself over the antral mucosa every 15 to 20 minutes in a healthy individual, and keeps it free of infection.

The antrum is the largest of the sinuses and by far the one most frequently infected. At five years of age it has an average capacity of 5 c.c. and in the adult a large maxillary sinus often holds an ounce or 30 c.c. of fluid or pus. It has been estimated that over half the cases of sinusitis are due to an infection in the antrum. This might be explained by the fact that in a general infection involving the anterior group of sinuses, the openings of the frontal and anterior ethmoid cells open close to the ostium of the antrum in

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(A short movie in colour on Nasal Cilia was also shown.)