The Burden Mental Research Trust staff has worked out the head products of the 10,000 Australian children and young adults published some years ago by Berry and Porteus. It found so close a similarity between these figures and those it obtained by similar methods on a smaller group of English school children of comparable age as to justify their retention for the basal purposes of the comparison of brain size with head size. Taking the curve for brain products as ascertained from the thirty-nine normals of the present investigation as the standard of comparison, it has been found that an almost exactly synchronous curve is obtained by taking 35/48 of the Australian children's head products as an index of their brain size. This proportion would then seem to be a close approximation to the actual proportion of brain size to head size. Since such a degree of accuracy would not be required for clinical purposes, the proportion of brain size to head size may be roughly assessed at two-thirds.

A living defective, aged 8 years, was found to have a head product of 177 (length $\times$ breadth $\times$ height). Two-

thirds of that is 118, which is approximately the brain size of a normal human infant of 2 months old. As this child has already passed the age when brain growth ceases it would seem unreasonable to spend time, money, or labour endeavouring to "educate" such an imperfectly constructed individual. No educationist should waste his time endeavouring to teach the rudiments of the three R's to a 2-months-old infant; yet to make the attempt on older defectives of similar cerebral rating seems to be the rule rather than the exception. It thus seems probable that these facts, when sufficiently well established and appreciated, will enable a scientific separation to be made between the "educable" and the "ineducable"—and these classes are not confined to certified and segregated defectives—with a corresponding diversion of labour into more profitable channels.

The product method of estimating the probable size of brain from that of the head of the living individual would thus seem to have a wider applicability than the restricted fields of mental deficiency, for the latter is but a pointer to the larger world beyond.

THE MIRROR TEST IN PULMONARY TUBERCULOSIS

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Radiological advances have in recent years led to a neglect of sputum tests. This is partly because the finding of bacilli merely indicates the presence of disease while the skiagram indicates not only its presence but, within limits, its extent and character. But though radiographic appearances may be so characteristic that they seem only to admit of one interpretation, probability rather than certainty is all that we can gauge from the average skiagram, and the last word remains with the bacteriologist.

The collection of sputum for examination is often a matter of difficulty. The patient who suffers from an only too well founded phthisiophobia may show small desire to supply a rope to hang himself. He may forget to return the sputum outfit or send back a sample of saliva. On the other hand the eagerness of the phthisiophilic to prove himself a suitable subject for compensation may induce him to fill his sputum bottle with sputum bought or borrowed from a consumptive friend, an artifice said to have been frequently adopted in military hospitals during the world war. A further disadvantage attaching to the sputum test as usually carried out is that it causes a delay in diagnosis that may be embarrassing to the practitioner and distressing to the patient. Nor is sputum always available, for it may be negligible in amount or unconsciously swallowed. As a short cough may spray a mirror with tubercle bacilli at a stage of disease when expectoration is absent, it is evident that portions of the air-way may be teeming with bacilli which will remain undetected if the usual vehicle for their discovery is lacking. This is perhaps especially so when expectoration has been abolished by collapse therapy, a method of treatment which also prevents radiographic exploration of the lung fields.

Laryngeal Mirror Method

A device which permits the immediate examination of secretion obtained directly from the air passages and which is more accurate than the ordinary sputum test

seems worthy of consideration. It is many years since Sir James Dundas-Grant pointed out that the ejection of pulmonary secretion may be provoked by the sudden inhalation of volatile mustard oil and that secretion may often be obtained by this means in apparently "unproductive" cases. In describing this method he mentioned that a laryngeal mirror might also be used to obtain samples, but his advice has been strangely neglected and the more elaborate and less reliable method of bacteriological examination of the faeces is usually recommended when sputum cannot be obtained. This method is only suitable for use in institutions and is not practicable for dispensary or surgery work. Apart from the difficulty of collecting suitable samples the isolation of organisms from stools demands much time and special skill and, even if acid-fast bacilli are at length demonstrated, some doubt as to their origin and significance must remain. Having lately employed the laryngeal mirror method and found it satisfactory, we feel that a short note on the results of our experience may be helpful to others.

The technique is simple. The test should, when possible, be carried out in the early morning. The patient and examiner sit as for ordinary indirect laryngoscopy and a large-size mirror—for example No. 6—is held with its surface horizontally above the larynx. The patient is instructed to give several short barking coughs, and the mirror is thus sprayed with bronchial secretion. It is then withdrawn along the roof of the mouth, care being taken to avoid brushing its surface against the tongue. Flecks of yellowish secretion of pin-head size are characteristic though not typical of tuberculous expectoration. Mucoïd or watery secretion usually but not invariably yields a negative result. The flat of the mirror is now applied to one end of a slide and drawn along it, leaving a thin film which is dried and stained in the usual manner. The possibility that the slide may be contaminated when the mirror has been used in a previous test is remote, but careful sterilization of the mirrors is essential. Dr. Hebert has suggested to us that the use of the all-metal mirrors now sometimes employed for indirect laryngoscopy might be a useful safeguard.

Comparative Results

The results obtained from a small series of mirror tests will show the usefulness of the method, and though statistical significance cannot be claimed for a limited number of tests it seems probable that a more exhaustive trial would prove that this method is more accurate than sputum examinations as ordinarily carried out.

The patients supplying the material were women suffering from pulmonary tuberculosis. Most belonged to the adolescent and early adult group, and the disease was

of early or early intermediate type. Two hundred tests were carried out each consisting of a mirror test with a sputum test as control when sputum was available, the sputum being taken at approximately the same period and in all cases within the same week. The material was supplied by seventy-five patients.

In sixty-one of the tests material containing pus cells and sometimes elastic fibres was found on the mirror from patients who stated that they were unable to raise sputum. In sixteen of the sixty-one tests referred to above tubercle bacilli were demonstrated. They were also demonstrated in ten mirror tests from patients who at a corresponding time had "negative" sputum. This represents an increase in accuracy of 13 per cent. as the result of using the mirror test. On the other hand no material was obtained on the mirror in eleven tests and in three cases material collected yielded a negative result although tubercle bacilli were demonstrable in the sputum—that is, in 7 per cent. the mirror failed to show tubercle bacilli in "sputum positive" cases.

Comparative Table

Mirror, T.B. positive ...	"No sputum" ...	16	} 13%
Mirror, T.B. " ...	Sputum, T.B. negative ...	10	
Mirror, no secretion ...	Sputum, T.B. positive ...	11	} 7%
Mirror, T.B. negative ...	" " " " ...	3	
Mirror, T.B. negative ...	"No sputum" ...	45	
Mirror, T.B. positive ...	Sputum, T.B. positive ...	26	
Mirror, no secretions or T.B. negative	"No sputum" or sputum T.B. negative	89	

Total 200

It should be noted that in this series a sputum test implies expectoration collected during a period of about twenty-four hours, while the mirror test only represents the matter ejected as the result of two or three coughs voluntarily made at a time when expectoration would otherwise not have occurred. The scales were thus weighted heavily in favour of the sputum test, and the results of the mirror tests are the more striking. Despite this, if we take the total number of tests, a positive result occurred forty-nine times in the mirror group while an equal number of sputum tests only gave thirty-seven. The increase in accuracy obtained by this simple means may be compared with the result of the more elaborate methods of sputum concentration. Dr. H. G. Frayer, in a recent report to the Joint Tuberculosis Council, stated that by the application of a modification of the Pottenger method he had been able to demonstrate tubercle bacilli in twenty-two out of 121 otherwise "negative" cases—an increase in accuracy of just over 18 per cent.

Conclusions

1. The examination of secretion ejected directly from the lungs and collected by a mirror held over the larynx is a quick and convenient method of demonstrating tubercle bacilli.

2. The mirror test frequently enables the confirmation of a diagnosis of pulmonary tuberculosis suggested by history, symptoms, or physical signs to be made without the delay which must occur when the patient is given a sputum outfit. Difficulties in securing the return of sputum flasks by post are obviated. This advantage will be especially appreciated by those who work in country districts or among uncivilized communities.

3. Malingering may be circumvented and the patient who consciously or unconsciously swallows his sputum may be induced to supply a sample of pulmonary expectoration by this means.

4. Compared with the ordinary sputum test the mirror test, to judge from our limited experience, is more delicate, and it may enable such accessory methods of examination as gastric lavage and bacterial investigation of the stools to be dispensed with. Though less delicate than the sputum concentration test it can be used when no sputum is available for that purpose.

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CONSERVATIVE TREATMENT OF LARYNGEAL DIPHTHERIA

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It may be of interest to record my experience of the treatment of laryngeal diphtheria from August, 1930, to April, 1936. The Scunthorpe Infectious Diseases Hospital has a cubicle block of eight beds available for the treatment of diphtheria, and serves an urban and rural population of approximately 60,000. During the past six years the incidence of diphtheria in the area has been low, but there have been a few outbreaks of a localized character occurring in different parts, with comparatively high mortality.

During this period eighteen cases of laryngeal diphtheria were admitted to the hospital. Another case in the area, owing to temporary lack of accommodation, was sent direct to a neighbouring isolation hospital. Tracheotomy was performed in this institution, but with fatal result.

A considerable proportion of the eighteen cases were admitted to hospital after the notifying practitioner had expressed the opinion that tracheotomy was required and should be carried out after admission. In two instances while I was on vacation tracheotomy was performed by my late deputy. One of the patients was admitted in a very toxic condition, well advanced in the third stage of croup. Both patients died shortly after operation.

Analysis of Cases

So far as the other sixteen cases were concerned all were successfully treated by conservative measures and all were eventually discharged cured. Upon admission each case was immediately treated by steam kettles, an adequate dose of antitoxin was administered, and a mixture of tinct. belladonnae and tinct. camph. co., 5 minims of each to one teaspoonful of water, was administered four-hourly. In a few cases hypodermic injection of camphor and/or brandy orally were also given.

Of the two children who died after tracheotomy in the institution one was a female aged 6 and the other a male aged 4. The former had had an injection of 10,000 units of antitoxin prior to admission. Of the sixteen patients who recovered, all were admitted in the second stage of croup with moderate or severe recession of the soft parts of the thorax. More or less frequent paroxysms were general, some of the patients being very distressed at times, with poor colour, occasional cyanosis, and weak, rapid pulse.

The age incidence of the sixteen cases was as follows:

Age	...	0-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	11-12
Cases	...	1	2	2	2	1	3	3	1	1