The usual symptoms came on, and some burning of the face, lips, and tongue with oedema were observed on arrival at hospital shortly after. This appeared to be a mild case, and after two days the parents removed the child against medical advice. The subsequent history illustrates the necessity for continued observation and treatment in subjects which appear at first sight to be mild cases of alkali poisoning. On December 18th, 1933, the patient re-entered hospital unable to swallow any liquid, and it was impossible to pass any kind of sound through the stricture of the oesophagus which had developed. Radioscopic examination revealed oesophageal stenosis opposite the third costal cartilage, and gastrostomy was performed on December 21st. During three months the patient has made uninterrupted progress on a diet consisting of soup, eggs and milk, dried milk preparations, orange juice, etc., given at four-hourly intervals.

The last case of this group (No. 7) concerned a Turkish girl, aged 16, who attempted suicide on January 19th, 1934, by taking about 5 grams (77.2 grains) of strong caustic soda solution. On arrival at hospital within the hour the patient was suffering from shock, and complained of burning pain in the mouth and stomach. There was also purging and much vomiting of blood. The body temperature was subnormal, varying between 97° and 98° F. It was possible to pass a small sound, and lemon juice was given freely. The patient recovered from shock and appeared to be definitely improving when the relatives removed her after she had been one week in hospital. On February 12th she returned to hospital—this time unable to swallow even liquids—and was, in consequence, much emaciated. Radioscopy revealed a stricture of the oesophagus opposite the fifth costal cartilage. The patient continued to lose strength, and it was suspected that the pylorus also was stenosed. On operation this was found to be the case, and palliative jejunostomy was carried out (March 2nd). The patient was afterwards maintained on a diet of citrated milk, eggs, soup, meat extracts, olive oil, liquid glucose, etc., but the emaciation was progressive, and death took place on April 2nd.

Conclusions

Poisoning by caustic alkali in Cyprus has increased remarkably during the last year, and has justified Government action in restricting its free use for domestic purposes. In all the cases studied the poison was obtained in this way. Of these the suicides were among the adults¹ and the accidental cases among the children. The fatal dose of caustic soda is less than 10 grams, and a quantity of 5 grams, in solution, has produced the most serious complications of stricture. There was perforation of the oesophagus in one fatal case, and possibly perforation of the stomach in another, while in another three cases stricture developed. Among the pathological conditions found post mortem, areas of necrosis in the liver and kidney have been observed (Case 4). It is evident from a study of these cases that the prognosis in alkali poisoning is doubtful, and that even in what appear to be mild cases the need for long-continued observation and treatment is essential.

We are indebted to Dr. C. H. Cuff, acting director of health, for permission to publish the results of this investigation.

REFERENCES

- ¹ Popper: *Klinik und Therapie Akuter Vergiftungen*, Leipzig und Wien, 1933, p. 33.
- ² Leschke: *Die wichtigsten Vergiftungen*, München, 1933, p. 87.
- ³ Balázs: Quoted in Popper, op. cit. (ref. 1), p. 33.
- ⁴ Registrar-General's Returns, 1930, 1931, 1932, London.
- ⁵ Taylor's *Principles and Practice of Medical Jurisprudence*, London, 1928, ii, 407.
- ⁶ Glaister: *Medical Jurisprudence and Toxicology*, Edinburgh, 1931, p. 690.
- ⁷ Blyth, Wynter: *Poisons, Their Effects and Detection*, London, 1920, p. 128.
- ⁸ Willimott: *Lancet*, 1933, ii, 413.
- ⁹ Cobham: *Mariti's Travels in the Island of Cyprus*, Cambridge, 1909, p. 118.
- ¹⁰ Starkenstein, Post, Pohl: *Toxicologie*, Berlin, 1929, p. 81.
- ¹¹ Loreta: Quoted in Rowlands and Turner's *Operations of Surgery*, London, 1927, ii, 101.
- ¹² Turner, Grey: *New England Journ. Med.*, 1931, ccv, 657. Quoted in *Post-Graduate Med. Journ.*, November, 1933.

IMPORTANCE OF LOCAL FACTORS IN THE ONSET OF PULMONARY TUBERCULOSIS

BY

W. PAGEL, M.D.

RESIDENT PATHOLOGIST, PAPWORTH VILLAGE SETTLEMENT
(From the Laboratory of Papworth Village Settlement)

(With Special Plate)

The problem of the origin of recent tuberculous infiltrations of the lung ("Fruhinfiltrate," "Rundherde") is still unsolved. One group of authorities emphasizes exogenous reinfection, whereas other investigators direct their attention to the possibility of an endogenous development of the isolated pulmonary lesion of the adult. The importance of local factors in the location of recent tuberculous foci is perhaps not sufficiently recognized. Thus it may be of interest to publish the two following cases.

History of Case I

The patient, a male aged 30, was in the Army (R.A.S.C.) for seven years, from 1922 to 1929. He was said to have been a heavy drinker until married. There was a family history of tuberculosis. The illness began with a gradual loss of weight and cough. For three months before admission there was blood staining of sputum and also morning vomiting.

POST-MORTEM EXAMINATION

Necropsy revealed carcinoma of the pancreas with metastases in the liver, spleen, kidneys, suprarenals, thyroid, right lung, and lymphatic glands all over the body.

Both upper lobes of the lung showed groups of miliary tubercles with areas of slight fibrosis and emphysema. The left lower lobe was normal, except for small groups of miliary tubercles at the apex and an old calcified focus in one of the lymphatic glands at the bifurcation of the bronchus. The right lower lobe contained a solid mass, of about the size of a tennis ball, close to the hilum: the tissue was firm and yellow, and resembled that of the enlarged mediastinal and abdominal lymphatic glands. The centre of this mass contained some anthracotic lymphatic glands with foci the size of a pea (carcinomatous metastases). Around the large mass was a group of small nodes with distinct walls, some of them liquefied (tuberculous foci) (Plate, Fig. 1). The pleura was thickened and adherent over the right lower lobe.

HISTOLOGICAL EXAMINATION

The tumour in the pancreas, and the secondary nodes in liver, spleen, suprarenals, kidneys, and lymph glands, showed on section solid carcinoma, partially adenocarcinoma.

In the upper lobe of the right lung there was fibrosis, with emphysema; proliferating tuberculous foci in the nature of miliary tubercles, rich in connective tissue and with many giant cells in various places; and caseous endarteritis of smaller vessels.

In the right lower lobe the big node close to the hilum was a solid carcinoma. In the foci surrounding this node caseous tissue with partial liquefaction was found. There were numerous tubercle bacilli in several foci, especially those made up of leucocytes; there were fewer bacilli in the large caseous foci.

Further examination revealed recent, partially liquefying, round tuberculous foci in this lobe. The foci resembled those described as early round infiltrations giving rise to the isolated pulmonary tuberculosis of the adult (so-called "Rundherde"). Such foci in a multiple form were first described by R. von Jaksch-Wartenhorst¹ as pseudo-tuberculous cysticercosis of the lung, later by Lachmann²—as atypical tuberculosis resembling tumour metastasis—and recently by Alb. Fraenkel,³ A. Albert,⁴ and Straub. In this case these foci were found in one part of the lung only (the right lower lobe), where they occurred in the neighbourhood of a large carcinomatous metastasis. The pleura was thickened.

As regards other tuberculous foci there was a miliary distribution in both upper lobes, which were partially transformed into small fibrosing areas. No evidence was forthcoming to show that aspiration accounted for the recent infiltration in the right lower lobe.

Discussion

The condition of the lungs as a whole, and the presence of endarteritis in several vessels, point to the conclusion that the foci in the lower lobe were haematogenous tuberculous metastases. This was also suggested by the obvious haematogenous miliary tubercles in the upper lobes. Thus the case shows: (1) the haematogenous origin of recent tuberculous caseous circular foci of the lung; (2) a discrete spread of miliary tuberculosis preceding the development of the early caseous infiltrations; (3) that the distribution not only of miliary but also of larger caseous foci may be haemic in origin; (4) the importance of local conditions in the occurrence and growth of recent tuberculous foci; and (5) the difficulty of the differential diagnosis between carcinomatous and tuberculous infiltrations of the lung, both being present.

In this case there are two important features: (a) the presence of a large carcinomatous metastasis, by diminishing the resistance of certain areas, favoured the development of tuberculous foci from blood-borne tubercle bacilli; (b) the pleuritic thickening was probably responsible for the localization of the carcinomatous metastasis and so, indirectly, for the development of the recent adjacent tuberculous foci in this part of the lung.

History of Case II

The patient, a male aged 36, walked to a hospital outpatient department four days before death. X-ray examination disclosed a unilateral miliary condition of the lung. The patient died of bulbar paralysis.

POST-MORTEM EXAMINATION

Necropsy revealed a tuberculous meningitis, with some small conglomerate tubercles in the brain and cerebellum. There was also right-sided caseous epididymitis; caseous transformation of the right vesicula seminalis; caseous nodules in the right side of the prostate; and generalized miliary tuberculosis of the spleen, liver, and kidneys—especially the right. The left lung was adherent, with plastic fibrinous exudate over the pulmonary pleura: there were no miliary tubercles on the pleura, and no effusion. The right pleura, including the diaphragmatic reflection, was covered with miliary tubercles, which were also present in the right lung. The left lung was atelectatic, with a very few tubercles confined to the apex (Plate, Fig. 2).

HISTOLOGICAL EXAMINATION

There was an exudative meningitis of the brain, conglomerate tubercles being surrounded by plasma cells and lymphocytes, with an evident increase of connective tissue. Miliary tubercles, with many giant cells and proliferating connective tissue, were present in the spleen, liver, and lymphatic glands, with caseous centres only in the right lung (Plate, Fig. 3). A considerable number of tubercle bacilli were seen in all tissues examined. There was caseous proliferation of the thoracic duct.

In various sections of the left lung only one or two very small tubercles were found in the apical region, adjacent to the walls of a small vessel and differing from those in the right lung by containing nothing more than giant and epithelioid cells (Plate, Fig. 4). There was no sign of caseation or of tubercle bacilli. Chronic collapse of the alveoli, with fibrosis of the walls and thickening of the covering pleura, with scattered caseous foci and several giant cells, were also observed.

Discussion

This case of acute generalized miliary tuberculosis presents the following points of interest:

(a) The first is the extremely short clinical course (four days). An acute meningitis and cortico-encephalitis were

the cause of death, the fundamental miliary tuberculosis of the lung and the caseous tuberculosis of the urogenital organs being completely latent. From the histological picture, which showed numerous plasma cells and a considerable amount of connective tissue, the development of the tubercles in the brain must have commenced some weeks, if not months, before death. The fibrosis around the tuberculous foci in the spleen and lung suggests a lengthy duration of the miliary condition.

(b) The second point is the unilateral localization of the miliary outspread of the lung (involving difficulties in the clinical diagnosis); the freedom of one side of the chest from miliary tubercles was probably due to its chronic atelectatic condition, caused by an old and recent partially exudative pleurisy. The occurrence of unilateral miliary involvement of the lung was observed by Schmorl and Schottmüller,⁵ the latter of whom pointed out its importance as an indication for artificial pneumothorax. Artificial pneumothorax should therefore be performed not only in order to keep the present foci undisturbed, but also, in producing atelectasis, to prevent the formation of new foci. There is no doubt that changes in the condition of the blood circulation are responsible for such events; this is demonstrated by cases of syphilis of the pulmonary artery, in which there is unilateral contraction of its branches and tuberculosis is limited to the same side (Hebb,⁶ Pagel⁷), as well as by recent experimental observations (E. K. Wolff and Rob. Klopstock,⁸ A. F. Vorwald⁹).

Summary

The first case demonstrates the haematogenous development of the early tuberculous, caseous, circular infiltrations known as the introduction of the isolated pulmonary tuberculosis of adult life ("Fruhinfiltrate," "Rundherde"). Both these show the importance of local factors in the development and localization of tuberculous foci.

REFERENCES

- ¹ Jaksch-Wartenhorst, R.: Pseudozysticercosis vorgetäuscht durch Lungentuberkulose, *Fortschr. Röntgenstrahl.*, 1929, xxxix, 6; *Med. Klin.*, 1923-4, 19-20.
- ² Lachmann: Atypische Tuberkulose Lungenmetastasen vortäuschend, *Fortschr. Röntgenstrahl.*, 1929, xliii, 407.
- ³ Fraenkel, Alb.: *Krankheitsanfänge bei chronischen Leiden*, Leipzig, Thieme, 1932, p. 134.
- ⁴ Albert, A.: *Beitr. Klinik Tuberk.*, 1931, lxxviii, 647.
- ⁵ Schottmüller: *Munch. med. Woch.*, 1929, xlvii, 1646.
- ⁶ Hebb: *Trans. Path. Soc. Lond.*, 1893, xlv, 45.
- ⁷ Pagel: *Berlin. pathol. Gesellst.*, 1929; *Klin. Woch.*, 1929; and *Lungentuberk. Handb. spez. pathol. Anatomie v. Henke*, Lubarsch, 1930, iii, 2, p. 441.
- ⁸ Wolff, E. K., and Klopstock, Robert: *Klin. Woch.*, 1933, xii, 41.
- ⁹ Vorwald, A. F.: *Arch. of Path.*, 1933, xiv, 286; *Arch. of Chest Surg.*, 1934 (in the press).

The Minister of Health, Sir Hilton Young, received a deputation on May 30th from the National Institute for the Deaf, the Counties Associations for the Deaf, the National College of Teachers of the Deaf, the Council of Church Missioners to the Deaf, and the British Deaf and Dumb Association. The deputation was introduced by Lord Charnwood, who spoke on behalf of all the societies represented. Their object was to suggest the necessity for legislation to make the welfare of the deaf the duty of local authorities, and to ask for the appointment of an advisory committee on the deaf. The Minister said in reply that he was in full sympathy with the desire of the deputation to promote the welfare of the deaf to the fullest possible extent. He believed, however, that progress was to be sought not in the imposition of compulsory duties on local authorities but in the encouragement of the work of these authorities and of voluntary agencies on the lines proposed in the circular on the subject issued by his Department (Circular 1337).

W. PAGEL: ONSET OF PULMONARY TUBERCULOSIS—IMPORTANCE OF LOCAL FACTORS

FIG. 1.—Right lung. Upper lobe: with emphysema and extension of miliary tubercles. Lower lobe: large carcinoma metastasis surrounded by recently liquefied tuberculous round foci. Thickening of pleura over right lower lobe.

FIG. 2.—Miliary tuberculosis. Right lung crowded with miliary tubercles. Left lung collapsed by recent and old pleurisy. Very few tubercles.

FIG. 3.—Miliary tuberculosis. Left lung: atelectatic lung tissue (A). Only one tubercle (T), without caseation and tubercle bacilli, consisting only of epithelioid, and giant cells.

FIG. 4.—Miliary tuberculosis. Right lung: emphysematous lung tissue (E). Numerous tubercles (T) with caseation and many tubercle bacilli.