After 4 successive passages in irradiated mice the disease still failed to effect non-irradiated mice of the same insusceptible stock, but could still be transmitted to non-irradiated members of the susceptible stock.

On subcutaneous inoculation of irradiated mice there was tumor formation at the site of inoculation (lymphosarcoma). This was not accompanied by systemic enlargement of the lymph nodes nor by an involvement of the blood.

These observations together with those reported by Richter and McDowell[3] and by Furth and Strumia[1] show that: (a) Lymphadenosis, aleucemic as well as leucemic, resembling closely the spontaneous disease, is best reproduced by intravenous inoculation. (b) Tumor formation (lymphosarcoma) may be produced by the material that causes systemic lymphadenosis when introduced by routes other than the intravenous. (c) Various strains of transmissible lymphadenosis differ from each other in the type of involvement observed (leucemic or aleucemic, intensity of infiltration, etc.). They differ also in their genetical behavior inasmuch as some strains may be transmitted to any stock of mice (Furth and Strumia), and some only to related mice (McDowell and Richter and the transmissible strain described here). The strain of Krebs and his associates can be transmitted only to mice whose resistance is lowered by irradiation. (d) These differences are dependent mainly on the character of the malignant lymphocytes, which retain their original properties after numerous passages.

6009

Specific and Non-Specific Cell Polysaccharides of the Human Type of Tubercle Bacillus, H_{37}.*

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Six hundred gram portions of ground, defatted human type (H_{37}) tubercle bacilli† were percolated with dilute acetic acid containing

[3] Richter, M. N., and MacDowell, E. C., *J. Exp. Med.*, 1930, **52**, 283.

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† Supplied through the courtesy of the H. K. Mulford Biological Laboratories, Glenolden, Pa.

0.5% of phenol until the neutralized effluent no longer reacted strongly with antiserum. The solutions were concentrated to small bulk *in vacuo* and precipitated with several volumes of alcohol. Further fractionation involved precipitation with glacial acetic acid, with alkali and alcohol, removal of the glycogen with saliva, removal of material precipitable with barium hydroxide (phosphates and a fraction [A]), separation of the residue into 3 main portions, (B_1) soluble in 85% methyl alcohol; (B_2) soluble in 75-85% methyl alcohol, and (C) insoluble in 75% methyl alcohol. Each portion was further purified by fractionation with glacial acetic acid or by special procedures which will be described in a more detailed communication. Fractions B_1 and B_2 are perhaps identical. Properties of the fractions are given in Tables I and II.

It is evident that at least two specific polysaccharides are present,

TABLE I.
Properties of Tubercle Bacillus H_{37} Polysaccharides.

Fraction	$[\alpha]_D$ degrees	Acid Equiv.	N %	P %	Redg. Sugars on hydrol. as glucose %	Basic Ash %
516/17 C	+95	6200	0.1		87	0.2
518/19 C	+85	7250	0.1	0.2		0.3
517 B*	+10	2800	0.7			0.5
518 B_1	+25	2200	0.8		61	
518 B_2	+26	1600		0.9		
519 B_1	+41	2100	0.6	1.0		0.9
519 B_2	+35	2800	0.6	0.2		0.4
518/19 A	+81	1500	0.7	1.8		2.8

* Separation into B_1 and B_2 was not undertaken in this case.

TABLE II.
Serological Reactions of H_{37} Polysaccharide Fractions.

Fraction	Dilution 1 to	5807A Anti-H_{37} Serum*	Serum absorbed with fraction C	517 B	Bovine C†
516/17 C	50,000	+++	—	(++±)	(±)
518/19 C	50,000	+++±	—	(++±)	
517 B	50,000	++++	++	(±)	(+±)
518 B_1	100,000	+++			(++)
518 B_2	50,000	+++±			(++)
519 B_1	50,000	+++±	+±	(±)	(++)
519 B_2	50,000	+++±	++	(+±)	
518/19 A	50,000	++±	+	(++±)	
Bovine C				(++±)	(—)

* Supplied through the courtesy of the H. K. Mulford Biological Laboratories, Glenolden, Pa. All fractions recorded in this paper reacted at dilutions of 1:2.5-4 million (highest dilution tested) with this serum. ( ) indicates after centrifugation.

† Bovine type bacillus C fraction.

each reacting with different antibodies. One of these, with the high optical rotation and low degree of acidity, resembles the chief polysaccharide of the bovine and avian type cells (unpublished results) and is perhaps identical throughout the whole group. It yields *d*-arabinose and mannose on hydrolysis. The low-rotating, weak polysaccharide acid of greater solubility is present, if at all, in far smaller amount in the bovine and avian type cells. It readily yields *d*-arabinose in crystalline form on hydrolysis. Mannose does not appear to be present. In addition the bacilli contain at least one other polysaccharide acid. Whether or not this is independently specific, or reacts with antiserum on account of an admixture with the other polysaccharides is uncertain. The results reconcile in a certain measure the divergent findings of Laidlaw and Dudley[1] and Mueller,[2] the method used by the former workers evidently resulting in a relative concentration of the high rotating specific polysaccharide, while Mueller's process appears to have concentrated material rich in the low rotating specific fraction. Masucci, McAlpine and Glenn's product from tuberculin[3] is also a mixture, judging by the properties given.‡

6010

Chemotherapy of Experimental Spotted Fever.

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No specific treatment has yet been developed for diseases caused by rickettsia. Because of the nature of the vascular lesions, and because of the localization of the virus in the endothelium, it would appear that typhus and spotted fever were especially amenable to intravenous chemotherapy. Studies[1] have shown that injections of

[1] Laidlaw and Dudley, *Brit. J. Exp. Path.*, 1925, **6**, 197.

[2] Mueller, *J. Exp. Med.*, 1926, **46**, 9.

[3] Masucci, P., McAlpine, K., and Glenn, J., *Am. Rev. Tuberc.*, 1930, **22**, 669, 678.

‡ In initiating this investigation the senior author was aided by Dr. Marie Maxim. Since she has assumed responsibility, in an entirely unauthorized communication (*Biochem. Z.*, 1930, **223**, 404), for the results up to the time of her severance from the work. Since the method used had previously been developed in this laboratory and since both methods and findings are now altered, the writers feel further reference to Mrs. Maxim on their part to be unnecessary.

[1] Reimann, H. A., *J. Imm.*, 1930, **18**, 153.