Not a single case of lymphomatosis has been observed among the 30 C57 brown mice and 10 A strain mice similarly painted for 145 days, nor among 35 dba, subline 212, control mice.

Summary. A general lymphomatosis has occurred in mice of the dilute brown (dba) strain (subline 212) following painting of the skin with a 0.3% solution of 9:10 dimethyl-1:2 benzanthracene in benzene. Bilateral lymphadenopathy of the axillary, inguinal or cervical lymph nodes appears as early at 95 days after birth, death ensuing within 2 weeks.

11125

On the Free and Combined Silica in Silicotic Lungs.

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While more analytical results for total silica in lungs are needed, there is a much greater need for values for the concentration of free silica, since it is so definitely known to cause silicosis. In the literature on the subject only several publications in the analytical line have to do with free silica in lungs and these reports are limited either to semi-quantitative results[1-4] or to calculations of silica by difference.[5, 6]

By modifying and extending the method of determining free silica in dusts, to lung residues, we have been able to determine minimum free silica. Since the chemical method involves digestion of the finely-divided lung ash residue in hydrofluosilicic acid (H_2SiF_6) in order to dissolve away silicates, and since finely-divided free silica is appreciably soluble in the above acid, we can, however, report only *minimum* free silica values.

The solubility of free silica in hydrofluosilicic acid varies with particle size, among other factors. Particles of silica as long as 10 microns may gain entrance to lungs, although the great majority

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TABLE I.

Silicotic Lung Analyses (Human).

Results are given on the dry lung basis. In each case 5 g of the tissue was taken for treatment with H_2SiF_6.

Lab. No. and case		Ash %	Total silica g	Total silica %	Total silica in ash %	Submersion in H_2SiF_6 Time‡ hr	Submersion in H_2SiF_6 Loss g	Fractions of total silica Free* %	Fractions of total silica Combined† (silicate) %	Age	Autopsy report bearing on silicosis.§
11	T.T.	6.48	.0389	0.389	6.00	342	.3145	83.80	16.19	54	Pneumonoconiosis, pulmonary fibrosis, cardiac dilatation, fibrous nodules in lungs and pulmonary tuberculosis.
15	S.G.	6.57	.1060	1.060	16.26	281	.2371	50.50	49.43	48	Silicosis, pulmonary tuberculosis.
17	M.L.	8.20	.2590	2.590	31.59	174	.3257	50.04	49.96	50	Lungs nodular and solid, pulmonary tuberculosis. Silicosis?
18	L.F.	6.91	.2780	2.780	42.08	377	.3278	10.40	89.56	38	Final stage silicosis.
19	G.H.	7.04	.0830	0.830	11.79	211	.3147	41.50	58.55	55	Severe anthracosis, liver degeneration, not silicosis.
20	B.	11.19	.5360	5.360	48.15	236	.2068	8.28	91.71	67	Dense lung adhesions, pneumonoconiosis, enlarged heart, arteriosclerosis.
22	J.Y.	8.96	.1980	1.980	22.30	395	.4610	8.00	91.91	42	Lungs firm, nodular and fibrotic, anthracotic lymph nodes. Silicosis and tuberculosis.
24	J.LaF.	1.91[1]	.0306	0.306	15.50[3]	92	.0821	41.80	58.17	37	Pneumonoconiosis, healed tuberculosis, right lung abscess.
25	DeM.	3.53[2]	.2650	2.650	75.07[4]	91	.1428	3.25	96.75	52	(Auto accident case.) Hypertrophied and dilated heart.
26	P.R.	5.41	.0430	0.430	7.09	370	.3101	67.00	33.02	43	Pneumonoconiosis and pulmonary fibrosis. "Much silica microscopically." Cardiac hypertrophy and dilatation.
27	C.S.	7.19	.2560	2.560	35.60	298	.3684	11.10	89.06	64	Pulmonary anthraco-silico-tuberculosis.
28	M.DiP.	30.35[5]	.0400	0.400	19.68	93	.0260	91.00	9.00	53	Pneumonoconiosis and pulmonary tuberculosis.
29	J.C.	5.35	.585	0.585	10.95	161	.2620	18.50	81.53	51	Tuberculosis of lower right lung. Diffuse modulation in both. Not typical silicotic nodules.
30	J.W.	7.62	.0910	0.910	11.95	394	.3651	12.30	87.69	49	Clinically chronic endocarditis with aortic stenosis and decompensation. No tuberculosis found. Silicosis?

[1,2] This value is probably low because of leaching by the preservative solution.

[3,4] This value is probably high because of leaching by the preservative solution

[5] This tissue contained an unusually large amount of aluminum, presumably from Portland cement.

* Not corrected for solubility in H_2SiF_6. The values are therefore considered to be minimum.

† These values are considered to be maximum because they are obtained by subtracting minimum free silica from total silica.

‡ Submerged in H_2SiF_6 until loss of weight by dissolving (of silicates) dropped sharply.

§ All cases except Nos. 26 and 30 were known to have been exposed.

found are less than 5 microns, averaging around 1 to 3 microns according to several investigators. Although we have attempted to establish a solubility correction by experiments on fine quartz, so far we have not been successful.

Total silica was determined by the usual gravimetric hydrofluoric acid method. Essentially the free silica method consisted in digesting the ash residues at room temperature with hydrofluosilicic acid and then determining the undissolved free silica by the hydrofluoric acid method.

Table I indicates data and results on 14 silicotic lungs obtained from autopsies in Buffalo and vicinity. More cases would have been desirable but were not available. The table is largely self-explanatory.

The results show that free silica varies greatly both in actual concentration and in percent of total silica; concentrations range from 0.086% to 1.296% of the dry lung; as a part of the total silica the free silica ranges from 3.25% to 91%. The variations are not out of harmony with the fact that different persons are subjected to breathing siliceous dusts of greatly varying compositions in silica and silicates.

It is to be noted that in 5 cases (Nos. 22, 24, 25, 29, 30) the minimum concentration of free silica is within the generally accepted maximum limit of 0.20% of total silica for normal lungs (on the dry basis). The total silica, however, in these cases is well above the normal.

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Carbohydrate Metabolism of *Oidium lactis* and *Bacillus subtilis* in Complex Carbohydrate-rich Culture Medium.*

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In previous papers the writer has shown that the rapid growth of pneumococci[1] and streptococci[2] in the usual laboratory media results in a large yield of lactic acid; a small part of the sugar is further

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