per cent, and for neutrophiles and monocytes in per cent ($P = 0.05+$).

When the relation of each blood factor to the severity of disease was plotted on a correlation table, the resulting relationships were strikingly non-linear, consisting of symmetrical and asymmetrical S, M, and U shaped curves. The red blood cells, the hemoglobin, the platelets, the total white blood cells, the neutrophiles, the basophiles, the lymphocytes, and possibly also the monocytes and the eosinophiles were all related in various degrees with the reaction of the host to experimental syphilis. In addition, no 2 blood elements had exactly the same relationship. These results indicate that the simple analysis by difference of the means and difference of the variance was not the most appropriate method of recording the degrees of relationship. The significant values obtained are, therefore, all the more remarkable in that the non-linearity was not taken into account.

It should be pointed out that all blood values observed in these experiments fall within the limits for normal rabbits. All animals appeared to be free from intercurrent disease and this feature determined their selection for these experiments. It would appear, therefore, that the hemocytological constitution as measured by preinoculation values has a statistically significant relation to the reaction of the rabbit host to experimental syphilitic infection.

## 7065 P

### Strain Differences in Susceptibility to Tar-Induced Skin Tumors in Mice.

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We have already shown that certain strains of mice are more susceptible than others to tumors of the lung, both spontaneous and tar-induced. There is evidence also that these differences in susceptibility segregate out in appropriate crosses as would be expected if they were dependent upon Mendelian units. The present report concerns tar-induced tumors of the skin in mice.

The technique was the one usually employed in such experiments.[1]

[1] *J. Exp. Med.*, 1925, **17**, 829.

A coal tar residue was applied to the skin of the mouse in the interscapular region 3 times per week for 4 months. After a latent period papillomas may arise which sometimes develop into carcinoma or malignant growths may develop without a marked papillomatous stage. The course of the experiment was followed by external examination. The final diagnosis was based upon microscopic sections.

Five groups of mice were used. Two were inbred strains which have been employed extensively in previous experiments. There were 100 mice from the agouti strain, No. 1194, and 80 mice from selected lines derived from Bagg albinos. A third lot of 23 mice were also Bagg stock but of different descent. They were grouped separately because they had not been tested for lung tumor susceptibility and turned out later to react differently in respect to skin tumors. A fourth group of 71 mice, pink-eyed, dilute brown in color, came from a very highly inbred strain, No. 62. The last group of 54 mice were hybrids of mixed ancestry but were uniform in being heterozygous for the dominant character hairless.

Strain 62 lived a much shorter time than the other 4 groups. By the 350th day no tumor-free mice were living so that no further change in tumor rate was possible. At this time $51.8 \pm 4.5\%$ of the mice which had survived the tarring had carcinoma. This rate was about the same as that of the hairless mice ($54.7 \pm 4.6\%$) but differed significantly from Strain 1194 ($25.3 \pm 3.0\%$) and the Bagg (a) group ($17.1 \pm 2.9\%$). The latter 2 do not differ significantly from each other. The small group of Bagg (b) stock were negative throughout the experiment. To make a mathematical comparison we may assume that if another animal had been included it would have been cancerous. On this basis the Bagg (b) mice would have a tumor incidence of 4.3% with a probable error of 2.9. This is significantly lower than the preceding rates.

The last 4 strains lived about twice as long as No. 62. By the end of the experiment the rate of the hairless had risen to $73.6 \pm 4.1$ %. Of the 1194 mice, $42.1 \pm 3.4\%$ had developed epitheliomas and of the Bagg (a) group $34.2 \pm 3.7\%$ had done so. The 2 latter rates do not differ significantly from each other but are different from the hairless and Bagg (b) groups. The rate of Strain 62 at 350 days was significantly greater than that ever attained by either Bagg group. Evidently there are marked differences in susceptibility to tar-induced skin tumors among these strains of mice.

Comparisons may be made as to the susceptibilities of different tissues. When the tar applications are distributed to a number of

loci instead of being repeated on the same spot lung tumors rather than tumors of the skin are induced. For 3 of these stocks data are already available after using this technique. The animals were killed on the 300th day, thereby giving uniformity as to age. For the skin tumor experiment also the percentages are cited for the 300th day. The Bagg (a) group had a high incidence of lung tumors ($92.8 \pm 2.1\%$) and a low percentage of skin tumors ($13.2 \pm 2.6\%$). In Strain 62 the situation was reversed. There were only $12.9 \pm 4.1\%$ lung tumor and a higher incidence of skin tumor ($51.8 \pm 4.5\%$). Strain 1194 showed about the same degree of susceptibility to tumors in the 2 organs ($22.4 \pm 4.0$ and $21.1 \pm 2.8\%$ respectively).

Data taken at the conclusion of the experiment in which the skin tumor technique was employed while not furnishing as strict a comparison provide additional evidence. The relationships here are similar to those already found except that in the 1194s the tumor incidence of the skin is now higher ($42.1 \pm 3.4\%$) than that of the lung ($16.2 \pm 2.9\%$). Both groups of Bagg mice have high lung tumor rates ($81.5 \pm 3.2$ and $80.0 \pm 6.0\%$ respectively), and significantly lower skin tumor rates ($34.2 \pm 3.7$ and $4.3 \pm 2.9\%$). The members of Strain 62 did not live long enough to give information as to their lung tumor susceptibility but the hairless mice show a high incidence of both tumor types ($73.6 \pm 4.1\%$ skin tumors and $73.8 \pm 4.6\%$ lung tumors). Evidently there is no correlation between the susceptibilities to tumor in the 2 organs. If these types are inherited separately there must be separate genes to represent them in the germplasm. More than one pair of Mendelian factors must be involved, though the exact number is undetermined.

## 7066 C

### A Serological Difference Between Eastern and Western Equine Encephalomyelitis Virus.

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From cases of equine encephalomyelitis in New Jersey and Virginia a virus has been secured which closely resembles that found