glucose of the normal cows even when as much as 3 g was administered in one dose. However, the injection of 1.5 g of cortisone into each of the 2 fasted cows resulted in a marked increase in blood glucose. This increase in the glucose was greater and was maintained at a higher level for a longer period of time than that observed in most cows with "spontaneous" ketosis that received the same amount of cortisone. A fasting ketosis was evident in these 2 cases, but the cows appeared to be quite normal otherwise. This was to be expected, since much more severe fasting has resulted in a marked hypoglycemia and ketonemia but has failed to produce the signs and symptoms typical of "spontaneous" ketosis (*8*).

It might be postulated that cortisone cures ketosis in cows purely because of the marked hyperglycemic effect of cortisone on fasted cows. The gross and histopathologic changes observed in cows with ketosis indicate a pituitary and adrenal involvement, however. Also, when smaller doses of cortisone have been used, the physical appearance of the cow has shown definite improvement before blood glucose increased. For example, Cow 2 in Table 1 exhibited a complete recovery of appetite and disapperance of incoordination within 20 hr after treatment with 900 mg of cortisone, even though blood glucose did not increase appreciably until the following day.

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Parthenogenetic Reproduction in *Phytomyza plantaginis* R.-D., the Second Reported Case in the Family Agromyzidae (Diptera)

Kenneth E. Frick

Irrigation Experiment Station,
The State College of Washington, Prosser

Hering (*1*) reported reproduction without males in *Phytomyza crassiseta* Zett., having caged unfertilized females with their host plant, *Veronica* sp. From these he obtained more females. He pointed out that it is exceptional to find a male in north Germany, whereas in south Europe the natural population consists of about 50% males.

Hering found it difficult to explain why parthenogenesis had not been found in the closely related *P. plantaginis* in Europe. Frost (*2*) mentions both sexes in describing the species from eastern North America. However, when the writer found that 125 adults reared from larvae mining the leaves of *Plantago lanceolata* L. in central California proved to be females, he set up a laboratory experiment to test the possibility of parthenogenetic reproduction in this species.

A specimen of plantain, free of larvae of the leaf miner, was transplanted into a gallon jar. Forty-six females, all reared from pupae obtained from Santa Cruz, Calif., and examined for sex, immediately upon emergence were introduced into the jar. After about 10 days a large number of mines appeared on the leaves. From these, 13 females were obtained, in addition to numerous larvae and pupae that were killed and preserved. The 13 females were then introduced into another jar containing plantain, from which 8 larvae were obtained. The experiment had to be terminated at this point.

A preliminary study of the reproductive system of those females producing viable eggs has shown the spermotheca to be present, indicating the possibility of fertilization in the presence of males. A study of the morphological basis for this phenomenon will be reported in another paper.

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Observations on the Apparent Failure of Beer's Law Near the Transmission Limit of a Solvent

J. M. Vandenbelt, Carola Henrich, and Shirley L. Bash

The Research Laboratories,
Parke, Davis & Company, Detroit, Michigan

A recent paper by Ungnade, Kerr, and Youse (*1*) reports variations in the extinction coefficient of phenol with change in solute concentration, which the authors ascribe to a failure of Beer's law. They obtained log ε values of 3.00 to 3.68 ($\varepsilon = 1{,}000$ to 4,790) for the 218–219 mμ primary (*2*) band, and a shift in the maximum to 225 mμ at the highest concentration. Since deviations of this magnitude are not usual in spectrophotometric practice, observations were made on the compound to investigate the response of our own Beckman spectrophotometer under the given conditions.

Solutions of phenol in 95% ethanol were prepared over the concentration range employed by Ungnade, Kerr, and Youse, and the absorption curves were determined, using a constant slit width of 1.0 mm through the maximum of the primary band. Variations in the absorption of this band were generally like those observed by Ungnade, Kerr and Youse—namely, a substantial decrease in intensity and an apparent shift of the maximum to 222 mμ. However, the extinction coefficient of the secondary band maxi-

TABLE 1

ULTRAVIOLET ABSORPTION OF THE PRIMARY BAND OF PHENOL IN 95% ETHANOL (READINGS IN 0.020-CM CELLS)

Phenol conc (M/liter)	λmax (mμ)	log ε max
0.000702	218.0	3.782
.00143	"	3.779
.00230	"	3.770
.00366	"	3.769
.00428	218.5	3.772
.00545	"	3.772
.00757	"	3.760
.01085	"	3.752
.01354	"	3.757
0.0168	"	3.739

mum at 272.5 mμ was unchanged beyond that to be expected with modification in solution density (*3*) and was not perceptibly shifted in wavelength. A repeat study on a second series of solutions yielded comparable results.

In view of the discrepancy in the response of the primary band, a series of determinations was made on phenol using water as the solvent. It has better transmission characteristics than ethanol in the lower wavelength region, and observations can be made at sensitivity settings nearer the clockwise limit, in spite of a shift of the maximum of the phenol primary band to about 210 mμ in this solvent. Six consecutive readings over the concentration range 0.0000458M to 0.000210M gave ε values of 6,060 to 5,700 (log ε 3.783 to 3.756) for the primary band, with an apparent shift of the maximum of perhaps 0.5 mμ. Readings at the 270 mμ secondary maximum over the concentration range 0.0001042M to 0.001026M gave ε values of 1,570 to 1,460 (log ε 3.196 to 3.165), with no shift in wavelength. Comparison of these results with those obtained in ethanol would seem to indicate that adequate solvent transmission is a necessary requisite to accurate observation in the lower wavelength region.

Accordingly, solutions of phenol in 95% ethanol were prepared over the instrument density range and read in absorption cells of 0.020-cm light path. The small light path with these cells causes a substantial reduction in solvent absorption and permits readings with 95% ethanol to approximately 202 mμ at a slit width of 1.0 mm. Table 1 gives concentrations and data for the primary band. It is apparent that only small variations in extinction coefficient and wavelength result over a fairly wide range of solute concentration.

The differences in absorption obtained when solutions of phenol are read in cells of standard (1-cm) dimensions as compared with cells of small light path reflect the ratio of the intensity of the stray (not monochromatized) radiation to that of the monochromatized radiation. When solvent transmission is low, so that instrument capacities are strained, the stray radiation becomes a significant part of the total available to the phototube. and a drop in observed solution density results. For example, if $I_o = I_m + I_s =$ 100%, where I_m is the monochromatized and I_s the stray radiation, when $I_m = 99\%$ and $I_s = 1\%$ for a solution transmitting actually 40% of I_m, the observed density will be $\log \frac{99+1}{0.4 \times 99 + 1} = 0.391$. If I_s rises to 10%, the observed density for the same solution will be $\log \frac{90+10}{0.40 \times 90 + 10} = 0.337$. These considerations are in accord with the conclusions of Saidel, Goldfarb, and Kalt (*4*) given in a recent discussion of false maxima and stray radiation in the lower wavelength region.

The experiments described above show that the wide range in extinction coefficient and wavelength shift observed by Ungnade, Kerr, and Youse for phenol in ethanol at different concentrations can be associated primarily with experimental difficulties in the region of reduced solvent transmission. Under suitable conditions, large variations indicating a failure of Beer's law do not appear.

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Progressive Tumor Resistance in Successive Generations of Inbred Immunized Rats[1]

Paul Myron Aptekman and Margaret Reed Lewis[2]

The Wistar Institute of Anatomy and Biology, Philadelphia, Pennsylvania

The influence of heredity on the incidence of cancer has long been the subject of investigation. Considerable evidence has been collected on the predisposition of humans to cancer, based on statistical studies, and the resistance and susceptibility to spontaneous and transplanted neoplasms, obtained from experimental studies in animals (*1–7*).

In earlier studies (*8–10*), it was found that rats of an inbred strain could be immunized against the growth of transplanted tumors by two methods of experimental procedure. The first method utilized subcutaneous injections of an alcoholic extract of tumor tissue for vaccination against tumor growth, after which the resistance of the treated rats was challenged by implantation of a small amount of viable tumor tissue. This method resulted in the development of tumor resistance in about 50% of the treated rats. Inbreeding of vaccinated rats resulted in an increase in response to this method of tumor

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