scending coronary branch was subsequently occluded in the manner described above. Eight of these animals died or were sacrificed in from 18 hours to 4 weeks after the arterial occlusion. The remaining 2 dogs died in less than 18 hours. These showed neither vascular filling defect (as determined by the injection technique) nor visible infarction. Of the 8 animals which died or were sacrificed 18 hours to 4 weeks after the arterial occlusion, 7 showed no vascular filling defect and 5 showed no infarction. The eighth animal showed a small vascular filling defect and infarction; another of the 8 animals showed a small infarct and one showed a myocardial hemorrhage. Apparently, therefore, in the majority of instances preliminary coronary sinus ligation prevents the appearance of infarction following acute occlusion of the left anterior descending coronary branch, and materially reduces the size of the infarct in others.

The operative mortality (within 48 hours after coronary sinus ligation) was 44% during our earlier experiences. This dropped to 20% in the last 10 dogs. Subsequent reports will deal with the technique employed and with certain characteristic electrocardiographic and other changes which follow these operative procedures.

It is hoped to apply this procedure to the human heart in order to increase the vascular tree.

8186 C

Birth Weight Criterion of Dwarfism in the Rabbit.

PAUL D. ROSAHN AND HARRY S. N. GREENE.

From the Laboratories of the Rockefeller Institute for Medical Research.

The procedure practiced in this laboratory with reference to birth weight determinations is as follows: Each morning rabbits born during the previous 24-hour period are identified by color markings or toe amputations and weighed to the nearest gram on a balance calibrated in one gram intervals. The average elapsed time from birth to weighing is 12 hours, the mid-point of the 24-hour interval between determinations. It is apparent that this routine introduces an error which is dependent on the amount of nourishment which each individual in the litter has obtained between birth and the determination, since the female rabbit suckles her young immediately following parturition. This error will vary with the

length of the interval between birth and the weight determination, and also with the number in the litter and the relative strength or weakness of each animal in it. The weaklings are frequently overpowered by their stronger sibs in the struggle for nourishment, and, moreover, the doe sometimes disregards her weaker offspring and refuses to nurse them. As a result, the weights recorded may deviate from the actual birth weights in a positive or negative direction, according to the relative strength or weakness of the animals comprising the litter.

The comparatively frequent birth of extremely small individuals in our colony has emphasized the desirability of ascertaining to what extent adverse conditions effective after birth could account for these dwarf-like animals, and also to establish quantitative criteria for the diagnosis of dwarfism in the rabbit. For this purpose an analysis was made of the variability in the birth weights of 565 individuals in 103 litters selected at random from the mating records of normal hybrid animals during 1933-1935. In all cases routine birth weight determinations were employed. The weight of each animal was expressed in terms of a percentage of the weight of the heaviest litter-mate. This procedure eliminates the variation due to differences in the absolute weights of animals of different litters since all observations are given a relative value. It is obvious also that the use of this method presupposes the presence of at least 2 animals in each litter. The resulting percentage values were grouped in classes in descending order of magnitude, and the frequencies in each class are shown in Table I and Fig.

TABLE I.

Frequency Distribution of Animals Comprising Normal and Dwarf Litters. Weight of Each Individual Expressed as a Percentage of the Weight of the Heaviest Littermate.

Group	100-90.1%	90.0-80.1%	80.0-70.1%	70.0-60.1%	60.0-50.1%	50.0-40.1%	40.0-30.1%	30.0-20.1%	Total
Normal	283	154	87	27	10	3	1	0	565
Dwarf	189	98	42	12	7	42	81	17	488
Total	472	252	129	39	17	45	82	17	1053

1. It is seen that the frequencies describe a fairly orderly decrease from the highest number in the 100-90.1% class to the lowest in the 40.0-30.1% class. Birth weights exceeding 50.0% of the weight of the heaviest littermate were noted in 561 or 99.3% of the 565 animals. A review of the ancestry of the 4 animals whose weights fell below the 50.1% class, in each case showed related litters con-

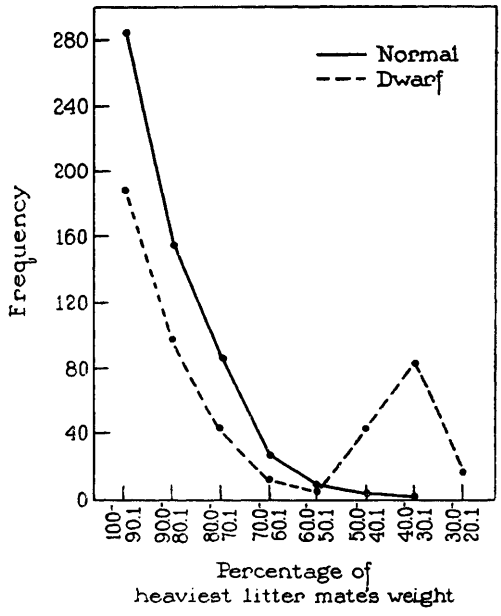

FIG. 1.

Frequency distribution of animals comprising normal and dwarf litters. Weight of each individual expressed as a percentage of the weight of the heaviest littermate.

taining similar small animals, and on this basis these 4 should probably be excluded from the normal group. The results of this analysis indicate that any adverse nutritive conditions which might be effective between birth and weighing are not responsible for animals whose weights are less than 50.1% of the weight of their heaviest littermate.

In connection with studies on a lethal dwarf mutation in the rabbit,[1] a similar analysis was made of the variability in the birth weights of individuals in litters containing unusually small, delicately formed living but nonviable young derived from known transmitters of the abnormality. The results are shown in Table I and Fig. 1. Here again, the frequencies in the different classes describe an orderly decrease from the 100-90.1% to the 60.0-50.1% class. The incidence in the succeeding groups differs radically from the previously described normal findings, as shown by the sharp rise to a high point in the 40.0-30.1% class followed by a precipitous fall in the 30.0-20.1% grouping. Of the 488 young, 348 or 71.3% had birth weights amounting to more than 50.0%

[1] Greene, H. S. N., Hu, C. K., and Brown, W. H., *Science*, 1934, **79**, 487.

of that of their heaviest littermate, and this is significantly fewer than the comparative figure for the normal group ($n = 1$, $\chi^2 = 172.3$). Of great interest is the fact that the frequencies for the normal and dwarf litters describe significantly identical trends from the 100-90.1% to the 60.0-50.1% class ($n = 4$, $\chi^2 = 6.0$), indicating that the factors influencing variability between these extremes are operative with equal effectiveness on both groups.

Conclusions. When the birth weight of a rabbit as determined by the routine procedure described is less than 50.1% of the weight of his heaviest littermate, a diagnosis of dwarfism is warranted. The birth weights of unusually small, nonviable animals derived from known transmitters of the abnormality fall below the 50.1% class, and these animals are, therefore, genetically true dwarfs in the sense that their abnormally low weights cannot be ascribed to environmental and nutritive factors operating in the interval between birth and the weight determination.

8187 C

Effect of Various Corticoadrenal Extracts on Diphtheria Toxin In Vivo and In Vitro.*

RAYMUND L. ZWEMER AND CLAUS W. JUNGEBLUT.

From the Departments of Anatomy and Bacteriology, College of Physicians and Surgeons, Columbia University.

This paper deals with the ability of various adrenal cortex extracts to raise the resistance of normal guinea pigs to injections of diphtheria toxin, and to inactivate the toxin *in vitro*. It is part of a research program[1] directed toward an understanding of the mechanism of natural resistance, and is an attempt to determine whether the adrenal cortex resistance factor can be isolated by the same chemical procedures used in extracting the vital hormone.

The 5 methods of corticoadrenal lipoid fractionation used are very briefly indicated on an accompanying composite chart (Table I). They have been studied by one of us (R.L.Z.) for a number of years and most of the essential principles have been reported by

* Part of the expenses of this paper were defrayed by a grant from the Rockefeller Foundation.

1 Jungeblut, C. W., and Zwemer, R. L., PROC. SOC. EXP. BIOL. AND MED., 1935, **32**, 1229.