injured tissues constitute a primary factor in shock, at least in so far as irradiated mice are concerned.

As to the marked ATP drop in the blood of tumor-bearing mice, little may at the present time be ventured in the way of interpretation. Whether this change in blood composition specifically reflects the tumor growth process, or whether it is merely a non-specific reaction to toxic materials released by a necrotizing lesion in the course of tumor growth, remains to be demonstrated. On such demonstration will depend the possible usefulness of our observation as a diagnostic tool. Also moot and as yet uninterpretable is the fact that total nucleotide levels during tumor growth do not change, whereas those of known nucleotide (ATP) do.

Summary. No changes were observed in the blood levels of total nucleotide or of adenylic acid, adenosine diphosphate, or adenosine triphosphate during the wasting period that follows whole-body X-ray irradiation of mice. Massive injected doses of ATP failed to induce overt symptoms of shock in mice.

In mice bearing implanted tumors there is a continuous decrease in blood adenosine triphosphate until about the 10th post-implantation day, followed thereafter for several days by a slight but significant rise in the ATP curve. The first phase of this curve parallels, on the time scale, the increase in tumor weight. Mice whose tumors were extirpated at stated intervals after implantation show a tendency to return to the normal ATP blood level. There is no apparent relation between changes in ATP blood levels and body weight, cell-fluid ratio in the blood, or hemoglobin, at least up to the 10th post-implantation day. No significant changes were observed in the total nucleotide values for blood during tumor growth; nor was the adenylic acid or the adenosine diphosphate picture different from that of normal mice.

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Encephalitis in Midwest IV. Western Equine Encephalomyelitis Virus Recovered from Nestling Wild Birds in Nature. (18788)

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Neutralizing antibodies to the virus of Western Equine Encephalomyelitis (WEE) have been demonstrated many times in the sera of wild and domestic birds(1,2). This virus has been recovered only once from wild birds. Cox, Jellison and Hughes(3) isolated it from the brain and spleen of a prairie chicken shot August 27, 1941, near Rugby, N. D. The present paper reports 3 isolations of the WEE virus from the circulating blood of nestling wild birds in Weld County, Colo.

As part of an extensive search for the natural reservoirs of encephalomyelitis viruses, 1941 blood specimens were collected from nestling birds of 20 species (Table I). Collection of these was begun the first week of May and continued throughout the summer.

Technic of taking blood samples was as follows: Blood was obtained from nestlings 4 or more days old. A blood sample consisted of approximately 0.1 ml of blood withdrawn by cardiac puncture or from a wing vein into a syringe containing an equal volume of 10% inactivated normal rabbit serum in buffered saline. Each sample was placed separately

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1. Howitt, B. F., and Van Herick, W., *J. Inf. Dis.*, 1942, v71, 179.

2. Reeves, W. C., Proc. of the 49th Ann. Meet. of the U. S. Livestock Assn., p150. Dec. 1945.

3. Cox, W. R., Jellison, W. L., and Hughes, L. E., *Pub. Health Rep.*, 1941, v56, 1905.

TABLE I. Nestling Birds' Bloods from Weld County, Colo. 1950 Tested for Virus.

Species	May		June		July		August		Sept.		Total		
	Nestlings	Nests sampled	Nestlings	Nests sampled	Nestlings	Nests sampled	Nestlings	Nests sampled	Nestlings	Nests sampled	Nestlings	Nests sampled	Positive nest samples
Pigeon	35	20	93	57	68	41	125	76	122	76	443	270	0
Barn swallow			7	2	91	22	45	11	10	4	153	39	0
Cliff swallow			32	11	108	46	36	15			176	72	0
Magpie	98	16	121	33	5	2					224	51	1
English sparrow	12	5	96	29	162	48	45	14			315	96	0
Yellow-headed blackbird			27	12	49	24					76	36	0
Red-winged blackbird			45	17	10	3					55	20	2
Other birds*	6	1	33	12	8	4	2	1			49	18	0
Total	151	42	454	173	501	190	253	117	132	80	1491	602	3

* Other birds included cormorant, great blue heron, marsh hawk, killdeer, avocet, mourning dove, long-eared owl, flicker, dipper, meadow lark, bullocks oriole, and bronzed grackle.

into a small tube and refrigerated immediately in a thermos flask containing wet ice. The tubes of diluted blood were sealed by means of an oxygen torch at the field laboratory and then stored on dry ice for shipment by air express to the Virus and Rickettsial Laboratory at Montgomery, Ala., to be tested for the presence of virus. The method of examining bloods for virus was as follows: Each blood sample was inoculated intracerebrally (0.02 ml) into 12- to 14-day-old white mice. No virus was recovered from any of the specimens except from the three mentioned earlier. The mice given the blood from these birds either died or became ill in 2 to 5 days. The brains of mice which died or showed symptoms of encephalitis were removed. Suspensions of these mouse brains were cultured and those free from bacteria were inoculated intracerebrally and intraperitoneally into 14-day-old mice, which either died or showed symptoms of encephalitis in 3 to 5 days. The 3 infective agents also proved to be pathogenic for guinea pigs.

After several serial passages in mice, identification of the viruses was undertaken. Each strain passed through a Seitz filter, was free from bacteria and was lethal to mice in a dilution of $10^{-7.6}$ to $10^{-8.7}$. By means of the neutralization test in mice each virus was found to be inactivated by antiserum of the Western equine encephalomyelitis virus, but not by antisera of the Eastern equine encephalomyelitis nor the St. Louis encephalitis viruses. The identification was completed by challenge inoculations of Western equine immune guinea pigs.

It was deemed noteworthy that the above procedures resulted in Western equine encephalomyelitis virus being isolated on 3 occasions from the blood of nestling wild birds obtained by the Encephalitis Investigations Unit working in Weld County, Colo. (Table I). Two of the bloods were from red-winged blackbirds *(Agelaius phoeniceus)*, 8 to 10 days old, and one was from a magpie *(Pica p. hudsonia)*, 21 days old. The red-winged blackbirds were from nests found near Nunn, Colo. and the infected blood samples were taken on June 26 and 30, respectively. The magpie was in a nest 10 miles south and 2 miles east of Greeley, Colo., and was bled June 29th.

The viruses differed slightly from the stock Western equine encephalomyelitis virus in having (a) a lower virulence for guinea pigs and (b) a slightly longer incubation period when first isolated, but otherwise serologically and immunologically similar to the stock Western equine encephalomyelitis strain.

Summary. Virus of Western equine encephalomyelitis was isolated on three occasions from circulating blood taken from nestling birds in Weld County, Colo. in June 1950.

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