Comments. The present study indicates that an extensive segmental gastric resection is an adequate operation for peptic ulcer if only 10% of the stomach by weight is left as the residual fundic pouch. However, when 25% or more of the stomach is left intact as a fundic pouch, this operative procedure fails to afford protection against the histamine-in-beeswax provoked ulcer. This latter finding is not surprising since 25% of the stomach is the amount found to make a suitable residual pouch to protect against recurrent ulcer in the conventional 75% gastric resection in which the antrum is also removed. Ferguson(3) has shown that vagotomy decreases histamine stimulated secretion by 68% in total gastric pouches, as contrasted with the observed secretion values from these same pouches before denervation. Nevertheless, a complemental vagotomy added to segmental resection when a 25% fundic pouch remains, fails to protect against the histamine-in-beeswax provoked ulcer (Series 5).

Summary. (1) An extensive segmental gastric resection in which 74% of the acid secreting portion of the stomach by weight is excised, leaving 10% of the entire stomach as the upper fundic pouch anastomosed to the antrum will protect against the histamine-in-beeswax provoked ulcer in the dog. (2) A segmental resection in which 25% of the stomach by weight is left as the fundic pouch will not protect against the histamine-in-beeswax provoked ulcer, whether or not a complemental vagotomy is done.

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Phosphocreatine in Red and White Muscle. (18895)

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The striated muscle of the turkey was reported by Krishnan and Nelson(1) to be a superior source of adenosine triphosphate as compared with that of a number of mammals. These same investigators noted that the white breast muscle provided a greater yield of this high energy phosphate than did the red muscle of the leg. Lohman(2) demonstrated that the pyrophosphate content of trichloracetic acid extracts of white muscle of the rabbit was approximately 1.5 times that of the red muscle. These findings suggested the possibility that a difference might also be found in the phosphagen (phosphocreatine) content of these muscles which might further reveal some relationship of this constituent to muscle activity.

An experiment was designed to ascertain relative levels of the creatine phosphate in the leg and breast muscles of the common fowl, and furthermore to compare these results with those obtained in similar muscles of "flying" birds, *i.e.* the pigeon.

Experimental. The analyses were made on samples of the anterior muscles of the thigh and the pectoral muscle of 6 White Leghorn pullets* and 6 pigeons of indefinite breed. All animals appeared to be in good flesh and health. No discrimination as to stage of the reproductive cycle was made in selecting the animals. Uniformity of experimental animals was of limited importance since the comparisons were made between the red and white muscles of each animal separately. Each pair of determinations were completed simultaneously and under identical conditions. The animals were anesthetized by the slow introduction of sodium pentobarbital intravenously, and were bled immediately prior to the removal of the muscle samples. The samples were taken alternately first from the breast or

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2. Lohman, K., *Biochem. Z.*, 1928, v203, 164.

* The birds were furnished by Dr. J. H. Bruckner, Poultry Department, Cornell University Agriculture Experimental Station.

TABLE I. Phosphate Content in Bird Muscle.

	Phosphorus, mg/100 g of muscle					
	Ortho		True inorganic		Phosphagen	
Animal	Breast	Leg	Breast	Leg	Breast	Leg
Fowl 1	91.2	93.3	20.7	61.4	70.5	31.9
2	86.3	92.5	30	72.5	56.3	20.1
3	97	81.4	53.3	66.8	43.7	14.6
4	86.8	77.3	13.3	51.9	73.5	25.4
5	83.8	76	16.2	42.2	67.6	33.8
6	99.4	81.9	12.4	34.6	87	47.3
Avg	90.8	83.7	24.3	54.9	66.4	28.9
Pigeon 1	80	92	46.3	54.1	33.7	37.9
2	69.8	91.3	43.3	60	26.5	31.3
3	87.7	91.8	54.1	47.7	33.6	44.1
4	83.6	93.2	50.5	60	33.1	33.2
5	95.7	115.1	43.7	54.7	52	60.4
6	87.2	86.4	47.3	36.5	39.9	49.9
Avg	84	95	47.5	52.2	36.5	42.8

the leg in the different birds.

The procedure of Fiske and Subbarow(3) as adapted by LePage(4) was followed for the separation of phosphocreatine. Phosphorus estimations were made colorimetrically using the ferrous sulfate method(5).

Table I indicates that the white muscle of the fowl breast contained over twice as much creatine phosphate as the red muscle of the leg. In contrast to these results, the creatine phosphate levels in the red breast muscle of the pigeon approximated those of the leg.

A comparison of red and white muscle was also made in single instances in the turkey and the turtle. Again the white muscle in both animals contained higher levels of the phosphagen as compared to that found in the red muscle in both species.

Discussion. The results obtained here were secured over a period of several months. Seasonal variation might explain the differences observed within a species, particularly with regard to the total phosphates. Wang(6), who reported on the muscles of a large number of rabbits, standardized for race and diet, confirmed the findings of other workers, that the phosphagen variations are real.

The phosphocreatine data presented here would indicate that the phosphagen reserve bears an inverse relationship to the low myoglobin level in white muscle and high content in red muscle reported by Bach(7). The white breast muscle appears to be an adaptation of some birds to meet their needs of bursts of energy for non-sustained flight. This is the antithesis of red smooth muscle where energy needs are fairly constant. Walaas and Walaas(8) reported the creatine phosphate content of smooth uterine muscle as being 1/50 the amount found in skeletal muscle, *i.e.* 1-2 mg %. Glycolysis in this case served by the abundant supply of myoglobin could satisfy the uniform needs for energy without a large reservoir of phosphagen.

The high white-muscle phosphagen levels described in this paper are consistent with Krishnan and Nelson's observation of a higher adenosine triphosphate content in white muscle than in the red muscle. Combined, these facts are complimentary to the explanation offered above for phosphagen reserve and intermittent but high demands for energy.

Conclusion. The creatine phosphate content of the white breast muscle of the fowl was found to be over twice as great as that of the red leg muscle. In the "flying" bird, the

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pigeon, the red breast muscle and the leg muscle contained approximately the same levels of this high energy phosphate.

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The Effect of BAL on Distribution and Metabolism of P^{32} and Sr^{90}. (18896)

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The administration of 2,3-dimercaptopropanol (British anti-lewisite or "BAL") has been reported to be of value in the treatment of poisoning from arsenic(1), mercury(2), and other heavy metals(3). Certain of the heavy metals(3) that produce their toxic effects by combining with —SH groups in the tissues thereby obstructing the processes of oxidation and reduction essential to tissue economy. Due to the high stability of BAL-heavy metal compounds, BAL has been regarded as a useful agent for preventing or reversing tissue —SH combinations with heavy metals and for removing heavy metals deposited in bone. The use of BAL for the removal of internally-deposited radioactive isotopes has been suggested and applied in a few instances with various results(4-6). It was the purpose of this investigation to examine the effect of administration of BAL on the retention and distribution of P^{32} and Sr^{90}.

The animals chosen for the study were C_3H male mice between 5 and 6 months of age. A total of 50 animals was divided into 2 groups of 25 each—one group for injection with P^{32} and the other for Sr^{90} injection.

A solution of BAL in peanut oil, at a concentration of 20 mg per ml, was injected daily into alternate thigh muscles of 15 mice in each group. The daily dose was 0.05 ml or 1 mg BAL per mouse(7). The animals were treated with BAL in this fashion for 3 days prior to injection with radioactive tracer and also after injection in the case of the animals which were retained for more than one day before sacrifice. The remaining 10 mice in each group were injected only with radioactive tracer and sacrificed at intervals as controls for the BAL-treated animals.

One group of 15 BAL-treated and 10 control mice was injected with carrier-free P^{32} at a dose level of 0.1 μc per g. The other group of BAL-treated and control mice was injected with carrier-free Sr^{90} at the same dose level (0.1 μc per g). Injections of both isotopes were made intraperitoneally.

Five animals of each group were sacrificed at each of the following intervals after injection: 0.5, 1, 24, 48, and 120 hours. Of the 5 animals sacrificed per group per interval, 3 were BAL-treated and 2 were controls. The pelt, spleen, liver, kidneys, soft tissue, femur, and residual carcass of each mouse were analyzed separately for their content of P^{32} or Sr^{90}. All measurements were made on the standard Geiger-Mueller end-window counter and compared with standards prepared from the original injection solutions.

In as much as the purpose of the investigation was to determine whether there was any alteration in the normal metabolic pattern, the total retention was of interest, and Fig. 1 presents a graphic plot of per cent retention of

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