

THE WAPITI OF THE RIDING MOUNTAIN, MANITOBA

An Ecological Study and Commentary

By H. U. GREEN

(Continued from Page 132)

BREEDING AND ASSOCIATED HABITS; GESTATION; NUMBER OF YOUNG

Male Wapiti are strictly polygamous and their one ambition during the few weeks of the rutting season is to acquire as many females as possible. The degree of success attained in the venture is governed alone by the virility and age of the individual. In other words, two or three year olds, although desirous, and capable, of performing the sexual act, stand little chance in open competition with their elders to copulate with more than an occasional unattached female unless a degree of guile, which is sometimes the case, is successfully exercised, a fact which equally applies to old males.

There is ample evidence, borne out by observation during parturition, that female Wapiti breed at the age of two years, giving birth to their first offspring when three years old. The duration of fertility is not known.

At the approach of the rutting season, which commences about September 10th and continues until about October 15th, the scattered bands of females, as previously stated, tend to foregather throughout the range without actually forming a herd. On the other hand, the males who have lived bachelor lives as individuals or in small companies remote from the females, drift in towards them from the terrain they have occupied since the breaking up of the winter congregations.

For a week or ten days prior to the beginning of the rut, the males commence to "bugle" their high-pitched calls which increase in intensity and volume with the passing days. Again mention may be made of the suggestion that the purpose of "bugling" is not one of challenge, for I have on several occasions noted males "bugling" when in the company of others of their sex. No animosity was observed. In fact, they paid no attention whatever to the vocal plaint of their companion, neither did he evince a pugnacious attitude towards his erotic friends.

Just before the rut begins the adult males draw apart, the "bugling" is more often heard,

especially during the evening and at night, and it is evident in every way that a degree of intense sexual passion controls the mental and physical reflexes of the individual. One quite often hears call after call emanating from one locality. A careful search of the vicinity guided by one's sense of smell shows where a male had stood and assumed a frenzied attitude of anticipation. The ground is torn up by pawing feet in a deep circular patch and soaked with strong-smelling urine. Nearby bushes are twisted and slashed by massive antlers. The vicinity of twenty-three such "calling stands" was examined for evidence of combat, but without avail. It seems quite certain that male Wapiti do not fight unless there are feminine spoils to reward the victor.

Seemingly overnight the period of rut commences and the most virile males appear spontaneously with a harem of females. I have no evidence to show by what manner they are acquired as the gathering is apparently accomplished under cover of darkness.

During the period of observation the breeding phenomena of nine herds were witnessed with the naked eye and by the aid of field glasses, and their numbers and other data duly recorded. The number of Wapiti in each herd was as follows:

1930

Field Note No. 67. 1 male 7 females 6 calves
Field Note No. 73. 1 male 9 females 9 calves
Field Note No. 84. 1 male 4 females 3 calves
Field Note No. 86. 1 male 11 females 9 calves

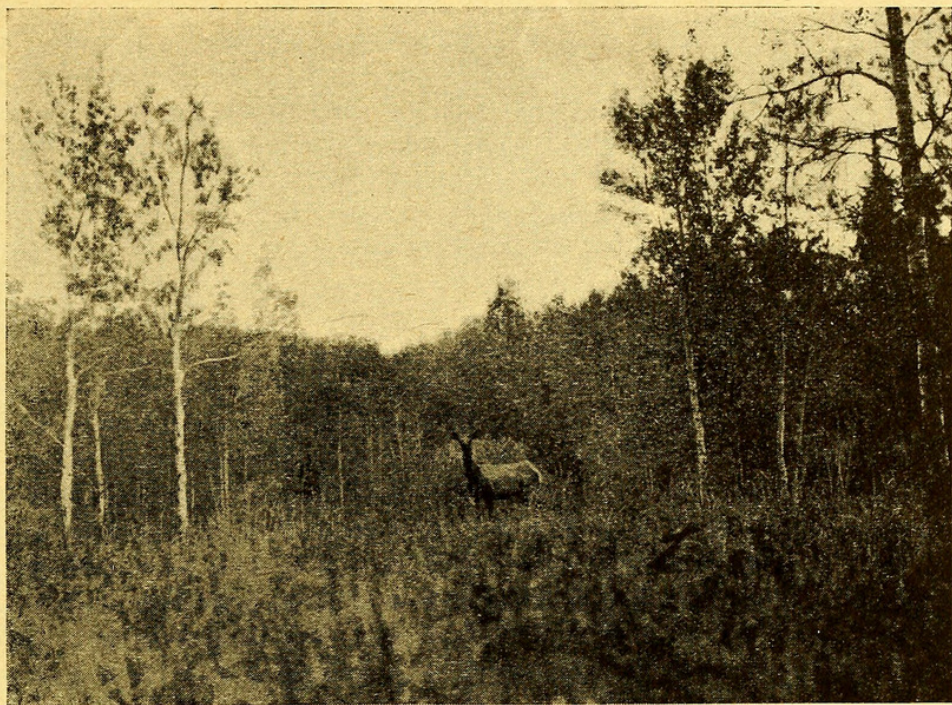
1931

Field Note No. 157. 1 male 13 females 10 calves
Field Note No. 163. 1 male 3 females 2 calves
Field Note No. 175. 1 male 12 females 9 calves
Field Note No. 189. 1 male 8 females 7 calves

1932

Field Note No. 260. 1 male 5 females 3 calves

It is quite obvious that, unlike female moose, the female Wapiti does not seek the male, but, on the other hand, is evasive and even indifferent. This is suggested, I believe, by the continual vigilance necessary on the part of male Wapiti to hold together their females who will wander off and break herd at every



Female Wapiti in Early Spring, Riding Mountain, Manitoba.

favourable opportunity. The question might therefore arise as to whether or not female Wapiti have a period of true oestrus like moose and domestic cattle, or akin to another female ruminant, the camel, depend on fertilization from a seasonal sexual activity of the males alone. In other words, while the female organs of reproduction are receptive to copulation and fertilization during the period of rut in the males, there is no conscious urge to seek connexion, and participation is a matter of course, unattended by sexual desire in the common acceptance of the term.

Among the herds listed, copulation was observed on eleven occasions, and at the time Field Note No. 157 was recorded the act was performed by the male thrice within four hours. Considering the length of the rutting period, there is little wonder that the males enter the fray as virile animals in good flesh and retire almost shadows of their former selves. It should be noted that this observation was made at the beginning of the rutting season when sexual vigour was at its height.

Copulation is effected without any amorous preliminaries. Once only was the male observed to approach a female near at hand and cover her. The remaining records show a lengthy run from some distance away—twenty or thirty yards—with the copulatory organ

partly extended, ending in what would almost seem a collision if the standing female did not sense the approach of the male and walk forward to ease the force of the impact. Accurate intromission is invariable, and the male withdraws almost immediately the female is covered and wanders off among the herd.

The testicles are scarcely noticeable until just before the rut, when they then appear to descend lower in the scrotum. Their normal size, judging from those examined in recently killed animals, is that of a pullet's egg. A flaccid penis, dissected from the sheath of an adult male in the spring of the year, measured 15.5 inches in length.

At the conclusion of the rut the sexes separate and the males show no further interest in the females until the advent of the next breeding season.

With mammals in a wild state it is impossible to estimate accurately the period of gestation. A fair approximation, however, can be gained by computing the intervening period between the beginning of the rut and the appearance of the first calves. In 1930 the rut commenced about September 8th and the following spring, 1931, the first calf was observed on May 20th. In 1931, the first evidence of the rut was noted on September 12th, and the first calf was seen in the spring of 1932 on

May 25th. Therefore it may be figured roughly that the period of gestation in Wapiti is about 32 weeks.

Local opinion is to the effect that female Wapiti give birth to twin calves. This, however, is not borne out by observation. My field notes contain data relative to 19 bands of females with calves at foot composed of from one to nine adults. Two observations were made of two calves suckled by one female. One observation of a band of five females with six calves, and the remainder with less or equal number of offspring in comparison with the number of adults. The observations quoted are dated during the months of July and August, 1930 and 1931, at which time of the year the calves follow their mothers in their ramblings. It would seem that twins are the exception rather than the rule, and that generally only one calf is born each season.

Little information upon the subject of twins can be gathered at calving time, as any twins born would be cached and nursed apart from one another.

ENEMIES AND DEFENCE

As in the case of all game animals, the Riding Mountain Wapiti's greatest enemy is Man. Extravagant destruction in the past was

fostered by the same inconsiderate attitude which exists to-day in a moderated form, for despite the efforts of wardens to prevent poaching, the Wapiti range is invaded from all sides to supply individuals who live thereabouts with a liberal amount of wild meat at all seasons of the year.

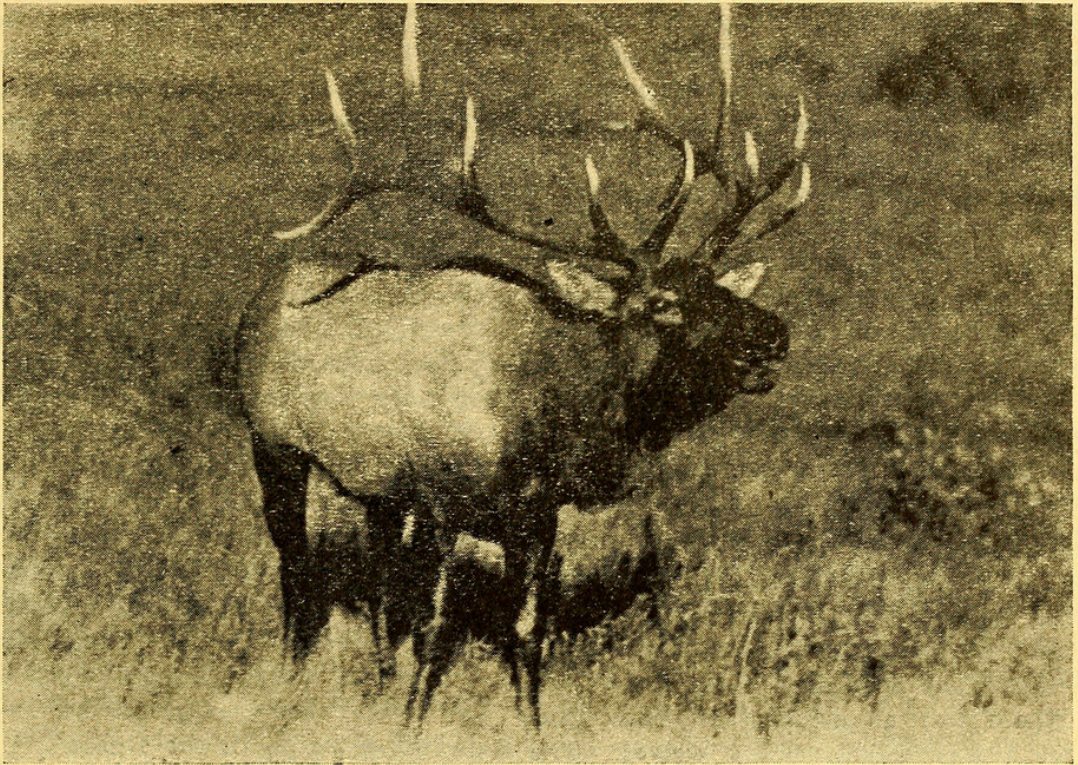
The original enemies of the Riding Mountain herd may be considered as the Gray Wolf, (*Canis lycaon nubilis*); Brush Wolf, (*Canis latrans*); Prairie Coyote, (*Canis n. nebracensis*); and Lynx *Lynx canadensis*. The Gray Wolf and Lynx no longer exist on the Riding Mountain range.

Apart from Man, the Brush Wolf has proved the only observed predator. Its cousin, the Prairie Coyote does not prefer a timbered terrain for a habitat, but no doubt took a fair toll of young and decrepit animals when the herd, in days gone by, occupied the lowlands during the winter months.

The greatest damage done by the Brush Wolf is apparently accomplished during the calving season in the months of May and June. In all, seventeen carcasses of small Wapiti calves were found showing signs of destruction by canine predators. The remains of eleven others were also encountered but the cause



Wapiti in Confinement Lead Unnatural Lives. Male with Antlers in "Velvet" at Brandon, Manitoba, in forced Company of Female.



Male Wapiti "Bugling".

of death could only be suggested. That a natural mortality exists during parturition, there can be no doubt. The percentage, though, would be small in comparison to the destruction brought about by Brush Wolves.

Regarding the destruction of Wapiti calves by Brush Wolves, it is appreciated that ocular proof is necessary in order definitely to establish a case. In this respect I was fortunate enough in June, 1930, to witness the death of one of these pretty creatures and, later, to gain additional visual evidence to support the fact.

The first instance occurred when Kenneth Fuller Lee and I were observing the behaviour of a female Wapiti in the Kennice meadow district. We watched her for some time behind the cover of a willow thicket on the edge of an open meadow. Presently, she must have caught our wind, for she cautiously walked towards where we were hidden, "barking" her apprehension. From her actions it was evident that she had a young calf cached in the vicinity. Suddenly she bounded away, whereupon a calf rushed from a small clump of willows close by, headed in the opposite direction, for the shelter of the forest. For a moment we watched its progress with interest, little expecting the untimely end it would suddenly

meet. It had scarcely entered a vista between the trees when three Brush Wolves appeared and fell upon the unfortunate animal, bearing it to the ground. It was the work of a moment, which we were powerless to prevent, although we hurried forward shouting lustily in an effort to drive the marauders away. Upon examination of the lifeless form we found the throat torn, the tender underparts cruelly lacerated, and the left hind leg hamstrung. The means employed to bring down the quarry resembled the gang tactics of the Gray Wolf, for they worked team-like to attain the end. No. 1 took a throat hold; No. 2 rent the underparts, and No. 3 grasped the hind leg.

The second instance happened during the latter part of May, 1931, in the same vicinity. Shortly after daybreak I set out alone from camp for the purpose of observing females. Emerging from the forest I settled down with field glasses beside the bole of a large spruce tree. About 400 yards away, five female Wapiti grazed on the lush grass of a meadow. Two young calves were partially visible, lying in the grass. Presently, the five females started off across the meadow heading for the forest on the other side. When about 200 yards away from the calves, who made no attempt to follow their dams, two Brush

Wolves appeared from a clump of bush and walked boldly towards them. I could see the calves hug the ground as the wolves approached. Then, one gained its feet and ran, uttering high-pitched cries, towards the nearest cover, followed closely by two wolves. I found its mutilated body a few minutes later. I did not, however, witness the actual killing as it happened in a thicket of willows. The evidence, although circumstantial, was sufficient to establish another case against the Brush Wolf. The second calf remained motionless during the tragic happening. It was still in its form which I returned to camp an hour later.

Brush Wolves also frequent the vicinity of the winter feeding grounds and may, when the snow is deep, pull down aged and weak individuals. Although numerous carcasses of dead Wapiti have been seen about the winter range, there was no evidence to show that their death was occasioned by wolves. The probability of Brush Wolves killing Wapiti over six months old is, I think, remote. Badly wounded or sickly animals could be secured with comparative ease, but at the present time there are no facts to substantiate the assumption.

As to the prevalence of Bush Wolves on the ranges under observation, it is impossible to arrive at even an approximate estimate. The slaughter of the Wapiti calves through their activity in the spring and early summer does not offer any tangible evidence, for when calves are plentifully scattered throughout a comparatively small area, even four or five wolves will search out and kill a goodly number in a very short period.

Mention may be made of the Black Bear as a possible predator on infant Wapiti. There is no particular reason for so doing other than to appraise the value of insistent statements made from time to time to the effect that bears have a penchant for tender Wapiti meat. Persons who informed me that local bears killed Wapiti calves could not furnish any evidence whatever to support the assertion and convicted on suspicion alone. There would seem no doubt, though, that a Black Bear might not overlook an opportunity to dine upon a Wapiti calf, but it would be unfair to condemn the animal without proof. Personally, I have no evidence to offer which would even suggest that the Black Bear on

the Riding Mountain range preys upon young Wapiti.

The degree to which female Wapiti might protect their offspring from Brush Wolves was evident on the last occasion on which I witnessed the destructive ability of these predators, as previously related. When the victim of the tragedy plaintively cried in terror, two of the females from the little band of five, who were still in sight when the wolves attacked, turned and ran towards the two calves, and although they could see what danger threatened their offspring their attitude showed aggression rather than fear. They were still advancing when I ran to see what had happened to the unfortunate creature the wolves had heeled to cover. Had I remained in hiding, I should no doubt have learned to what extent the maternal instinct of Wapiti asserts itself. As it was, they hesitated when I appeared and sought their companions who, by this time, had disappeared in the forest.

On several occasions I have seen female Wapiti during the calving season advance boldly towards a dog who was doing nothing but minding its own business. These instances, too, furnished no direct information as to what would eventually have happened, for the dog in question, well-behaved animal that it was, believed that discretion was the better part of valour and sought safety in flight. There seems little doubt, however, that, whenever possible, female Wapiti will defend their offspring against wolves and other small animal predators.

Unlike cow-moose, who countenance no familiarity with their young by Man, the female Wapiti is ever fearful when humans are concerned. During the calving seasons when the Wapiti were under observation three occasions were experienced of females returning to their calves when they cried lustily for a few moments after being captured for examination. In all, 63 calves were handled, 37 of which were found in company with their dams who, with the exception of the three occasions mentioned, left them to whatever fate might befall them. The females who returned left the scene hurriedly upon being disturbed and were absent from sight for some minutes. Every opportunity was allowed for a show of aggressiveness, but fear for their calves rather than a desire to drive off an interfering intruder was evident from their demeanour.

One advanced to within 20 yards; the others were content to remain at an even more respectful distance.

I have nothing to offer regarding the defence attitude of males.

POSSIBILITY OF DISEASE; EXTERNAL AND INTERNAL PARASITES; BITING FLIES

It is evident that during the past few years no epizootic outbreaks have occurred among the Riding Mountain Wapiti. However, epizootics originating from domestic animals who range about the borders of the reserved area and, during the open months, the most heavily populated Wapiti terrain, are deserving of consideration as possible menaces of the future.

Epizootics of hemorrhagic septicemia, Bangs disease (contagious abortion) and necrobacillosis, would, should they occur, reduce the herd appreciably. Bangs disease and necrobacillosis have already been encountered among the Wapiti in the United States. Anthrax, too, is a possibility.

Hemorrhagic septicemia broke out during the summer of 1931 among sheep which ranged a few miles distant from the Wapiti country, with the usual casualties. Had the infected flock pastured on the borders of the reserved area, which is often the case, the resulting consequences would undoubtedly have given genuine cause for alarm.

Bangs disease is a malady commonly acquired through the mouth by consuming food and drink contaminated with *Bacillus abortus*, left by infected animals. Regarding the prevalence of this disease among Wapiti, probably originating from domestic cattle permitted to occupy their range, I quote W. M. Rush of the Yellowstone National Park, Wyoming, U. S., who recently investigated the cause of Bangs disease among the buffalo and Wapiti in the Yellowstone National Park. It is believed that the buffalo became infected from a range occupied by domestic cattle and that neighbouring Wapiti also acquired the disease from a similar source.

Mr. Rush says ¹, referring to the agglutination test for *Bacillus abortus*: "... as 1 a t of the elk [Wapiti] herd uses the same range as the buffalo some tests from these animals were made. Thirty-five blood samples were taken from elk [Wapiti] wintering in the

vicinity of Mammoth, 30 miles from the buffalo range. Two of these showed contact with *Bacillus abortus* and were classified as suspicious. . . . "

"Thirty-two samples were taken from elk [Wapiti] ranging in proximity to the buffalo range. Of these three were positive, eight suspicious, and twenty-one negative. These tests indicate that the disease has become established in the elk [Wapiti] herd and will be another factor in further depleting the number of these animals."

The action necessary to prevent the possibility of Bangs disease appearing among the Riding Mountain Wapiti is obvious and worth the effort required to prevent domestic stock invading the range. Once introduced it would be difficult indeed to detect and control, for every infected male becomes a life-long carrier of the malady without apparent ill-effect to itself.

An epizootic of necrobacillosis among the elk, (Wapiti) moose and deer of Jackson Hole, Wyoming, U. S. broke out in the winter of 1927-1928 during the course of an investigation by Mr. O. J. Murie, U. S. Biological Survey, who was at the time engaged in field work relative to the problems of herd management. A study of the disease revealed the fact that *Bacillus necrophorus* invaded the system by way of oral lesions attributed to Squirrel-tail and other objectionable grasses in hay fed during the winter months. The mortality amongst the elk (Wapiti) at Jackson Hole in the winter of 1927-1928 totalled 409, a few of which died from other causes.

The data accumulated by Mr. Murie are invaluable for reference in the event of a possible outbreak of necrobacillosis among the Riding Mountain Wapiti should the disease be acquired at any future time, either through the necessity for winter feeding or under natural range conditions.

Mr. Murie² in his etiology of the subject states: "In the majority of cases grass seeds were found lodged in the lesions of the mouth, or wedged rigidly between the teeth or in the ulcerated tooth sockets. These were identified as the seeds of *Hordeum nodosum* (Squirrel-tail grass) with a lesser amount of *Bromus tectorum* (Brome grass). Short dried fragments of *Juncus* stem (Rush) were also found in a few cases."

¹ Journal of Mammalogy 13: 371-372.

² Journal of Mammalogy 12: 217-220.



Herd of Bachelor Male Wapiti Awaiting the Advent of the Rutting Season.

"Probably the most serious factor is the presence of Squirrel-tail grass in the hay. The action of the awns of these seeds in domestic animals is well known. Once having gained entrance to the tissues of the mouth or throat, they produce lesions. Suppuration takes place, and often results in great lumpy exostosis on the jaw. Any such break in the lining of the mouth offers an opportunity for entrance of *Bacillus necrophorus*, which takes the advantage with deadly result."

Mr. Murie continues: "It is rather impractical to treat diseases in wild game and the solution must be prevention as far as possible. The obvious thing to do is to eliminate Squirrel-tail and similar obnoxious grasses from any hay that is fed to the animals."

The importance of Mr. Murie's suggestion is of great value, for large quantities of Squirrel-tail grass (*Hordeum nodosum*) grow in and about the many meadows on the Riding Mountain range which, if hay feeding ever became necessary, would be drawn upon for a supply.

The presence of osseous necrophorus lesions about the articular surfaces of long bones arising as a secondary condition of necrobacillosis, has been sought among old skeletal remains of Wapiti on the Riding Mountain in an effort to establish the possibility (with the necessary assistance) of early infections. No evidence, however, was obtained.

Other possible diseases suggest themselves, but it is felt that the limited knowledge of animal pathology acquired by the writer, forbids a deeper invasion of the subject. Sufficient has been said to stress the importance of prevention through competent herd management of the Riding Mountain Wapiti and other native deer indigenous to the wapiti range.

Only one external parasite has been observed to infest the Riding Mountain Wapiti: the Moose tick, (*Dermacentor albipictus*). This parasite is invariably, but not abundantly, present on the hides of recently killed animals at all seasons of the year. They are very noticeable in the spring when shedding commences, for many are rubbed off with the detached hair when the host seeks to rid itself of the clinging encumbrance and, incidentally, its numerous guests. I believe that the moose inhabiting the same terrain are generally more infested by the moose tick and, consequently, more irritated. I have often seen moose during the first warm days of spring whose flanks and shoulders were raw and bleeding, presumably the result of rubbing against the rough bark of trees in an effort to allay excessive irritation. Wapiti have never been observed suffering from similar conditions or who in any way appeared discomforted, although undoubtedly infested to some degree. This fact might suggest that *Dermacentor albipictus* was originally an isolated parasite peculiar to

the genus *Alces* on which it finds greater protection and comfort amid denser pelage. Unfortunately, I have no information to offer at this time regarding its breeding habits and larval development.

Observed internal parasites of the Riding Mountain Wapiti are: Tapeworm (sp?); Round worms (*Ascaris*); and Stomach worms (*Strongylus*). Although subject to infestation by the liver fluke (*Fasciola magna*) this parasite was not noted in the livers examined.

Biting flies of the several species which irritate domestic cattle are evident in due season

and without doubt cause the Wapiti annoyance. On numerous occasions Wapiti have been seen to behave as if bothered by nose-flies, running with tossing heads and from time to time rubbing their noses against their fore legs.

A small unidentified insect is invariably found infesting the muzzle and nasal orifices of young calves. Apparently they do not bite or otherwise cause irritation, as their presence is tolerated without objection. I believe they are attracted by the natural moisture.

Further study is necessary regarding the parasitology of the Riding Mountain Wapiti by more competent authority.

(To be concluded)

BULL-FROG APPETITES

By P. A. TAVERNER



WITH reference to W. E. Scott's note in the September, 1933, number of *The Naturalist*, p. 143, on Bull-frogs eating trout.

Though not a herpetologist in general or a "frog-ologist" in particular, I have had considerable to do with Bull-frogs, especially in "collecting" them for epicurean purposes. The method of catching them with red flannel bait on a hook has been used and found admirable where frogs were plentiful, or sport, rather than frogs' legs, the principal objective. An early discovery in this method of capture was that after the red flannel had been shed on surrounding bushes or whipped off in the air, the bare hooks remained practically as efficiently attractive as before, the only loss seeming to be their decreased visibility. Another practical observation made was that the bait or the hook had to be in motion to arouse the interest of the victim. It was evident that it was motion, not form, shape or colour, that was essential to the deception that barbed hooks were tempting provender. Experiments with various baits and methods developed that a Bull-frog will attempt to eat anything that moves within its immediate field of observation. A rolling pebble is snapped up as quickly as a scurrying beetle, and a dangling grass plume is jumped at as readily as is a passing insect. The object may be rejected as inedible after trial but the general policy is to catch first and try afterwards that no possible opportunity be wasted. Even then memory seems short, or tactile reactions are deemed unreliable, for often second and third attempts may be made on the same object and sometimes even alarming,

or presumably painful, experience with lacerating hooks will not deter from further and immediate adventure. A frog's psychology seems to be that anything that moves is alive and anything alive is good to eat,—bar nothing it can swallow. Size is a secondary consideration, trial is the only criterion and the size that a hungry Bull-frog with grim determination can envelope sufficiently for the process of digestion is surprising. If a tail or two, or other odd parts have to hang without for a while, it is too bad but cannot be helped and is certainly no reason for foregoing the bellyful that does find comfortable lodgment inside.

Old readers of *The Naturalist* may remember reports of Bull-frogs eating Orioles and Olive-sided Flycatchers, and some years ago naturalist circles were stirred to the depths by charges of nature-faking, and elections to the Ananias Club, because one had embroidered his tale with a story of a Bull-frog fielding Tree Swallows in flight. It is not at all probable that Bull-frogs regularly climb trees or tall dead stubs after Orioles or Olive-sided Flycatchers or go careening into the air to catch Swallows overhead, but there is little doubt that, should a bird of any reasonable degree of smallness come down to drink or bathe too near to a semi-concealed Bull-frog of proper bigness, the latter would avail itself of the opportunity, with very good chances of success. The same would undoubtedly be true of fish, tadpoles, mice or anything else that proclaimed its vitality within seizing distance of this animated grave-yard.

Bull-frogs have long been blamed and probably justly so, for considerable mortality among the downy young of ducks and water birds that are



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