

in your office. Whenever any speech is made primarily to communicate information, a summary should be given before the conclusion. The same thing is true of a "paper."

Your paper may stand alone whether you read it or not, but converting it into a speech may improve its flavor!

SUMMARY

"Giving a paper" means, in common acceptation reading your manuscript of facts and ideas to an audience of your peers. This is permissible. However, you can make "double coverage" of time allotted for presentation by having copies of your formal paper mimeographed for passing out after the period and by utilizing the time to talk from notes and injecting refreshing data not included in the formal manuscript. Also, you will have a chance to emphasize main points and to dramatize your efforts.

There is little difference between preparing a manuscript for publication and in giving a public speech. The underlying theme is the same. Techniques of giving a good speech should be employed whenever possible: Be Prepared, Get Contact, Avoid Nervousness, Maintain Bearing, Avoid Mannerisms, Be Enthusiastic, Be Heard, Be Understood, Avoid Excuses, Be Timely, Use Visuals, and Recite Beforehand.

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TRANQUILIZING TECHNIQUES FOR CAPTURING DEER

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ABSTRACT

Improvements were made in existing techniques for capturing and handling deer with the oral tranquilizing agent Tranimul.*

One hundred twelve wild deer were captured. Of these, 99 were transported away from the capture sites.

Sika deer (*Cervus nippon*) and fallow deer (*Dama dama*) reacted to treatment very much like the white-tailed deer (*Odocoileus virginianus*).

Site selection, pre-baiting, treatment rates and application of drug to bait are discussed. Recommendations are made relative to bait trays, capture nets and tying straps.

Capturing, tying, carrying and hauling of tranquilized deer are discussed, as are post release treatment and mortality factors.

Suggestions for further research are made.

INTRODUCTION

From results obtained prior to January of 1964 it was apparent that the drug Tranimul showed promise as an agent for capturing wild deer. It has been used a number of times, and administered both intramuscularly and orally to captive deer. (Murry & Dennett 1963.)

A demonstration was arranged for January 21, 1964, and personnel from other game agencies were invited to witness our first large scale effort to catch wild deer. Only 12 deer were caught that evening and a report describing the operation was prepared (Murry & Dennett 1964).

This report is based upon work accomplished under Pittman-Robertson Project W-29-R.

* Trade Mark—product of Hoffmann-LaRoche

Suggestions for the improvement of techniques were solicited from those present. Armed with these new ideas, plans were made for considerable modification of techniques.

Some equipment changes were made prior to a limited amount of work in four captive deer pens in the fall and early winter of 1964. The results of these efforts pointed to the need for added improvement.

After more changes and further development of equipment, we were able to handle 112 wild deer, 66 exotic deer and 46 white-tails, in nine capture efforts. Success ranged from 0 to 32 individuals handled per effort. Although our capture plans were designed to provide a maximum catch, rather than to experiment with techniques, several avoidable mistakes were noted as was a need for more research. Ninety-nine of the captured wild deer were hauled away from the capture site.

The purpose of this paper is to disclose our present techniques, call attention to some of our avoidable mistakes and to make suggestions for future research.

Sika deer (*Cervus nippon*), fallow deer (*Dama dama*) and white-tailed deer (*Odocoileus virginianus*) were all handled during the development of techniques. Since both the exotic deer and native deer reacted in much the same manner, our observations were used interchangeably. One exception was a rasping, bark-like alarm call uttered by partly drugged Sika deer and possibly also by fallow deer. One animal would commence with a series of calls that seemed to alert all of the deer in the area. Sometimes several others would join in the calling. Most deer would move from the center of the field to the edge of the woods. They would stand motionless with heads erect in a posture of alertness.

Capture, handling, hauling and post release techniques were essentially the same for each species. The exotic deer population was enclosed by a deer-proof fence which surrounded approximately 4000 acres of a scenic garden.

SITE SELECTION

I feel that a problem deer herd is a requisite for mass capture of deer in Louisiana. They must be numerous enough to concentrate by pre-baiting, which is defined as offering feed at a regular time in order to attract deer to a preselected capture site. Bait sites should consist of park-like woods, small clearings surrounded by open woods or large clearings free of dense brush cover for several hundred yards from the center of the field.

We treated exotic deer along firebreaks in 12-year-old stands of slash pine (*Pinus caribae*) and found that the manpower requirements to thoroughly search for drugged deer were greatly in excess of that needed where large clearings were used.

We baited one-acre food plots on one area which had a high deer population. The food plots were surrounded by thick undergrowth which made location and capture very difficult.

The site ideally is located on firm ground that can support a deer-hauling truck in the event deer are captured for transplanting. Ditches and net fences sometimes aid in the capture of deer by delaying the escape of a few uncoordinated but still ambulatory animals.

A secluded area unlikely to receive human visitors the evening of the capture effort is essential. Local people who wish to observe the operation can visit the treated site prematurely and greatly reduce success. Tracks on one area indicated that spectators had made an effort to capture a drugged deer not long after the baited feed had been placed. Very little feed was taken and the catch of seven animals was disappointingly small for this operation.

A bait site free of domestic farm animals is an essential in site selection. When necessary we have had livestock shifted to another area or have selected cattle-free fields to use throughout the pre-baiting and capture. Our most serious interruption by competing livestock was caused by feral hogs. This occurred on a game management area in the one-acre food plots previously mentioned, where hog competition allowed us to treat very few deer. The surrounding thickets prevented capture of any animals that might have been adequately

dosed. Two of our three totally unproductive evenings were spent on this area.

Predatory animals rank high in considerations for selection of a site. Free ranging dogs were blamed for our third complete failure. In this case all of the ingredients for success seemed to be present. A large herd of deer had been on bait for several weeks. Hauling trucks and catching crews were called in. People at the release site were alerted and the treated feed was placed out at sundown just as had been the custom with the feed each day.

A dragline had been moved into the area and placed on a little used road on the timbered side of the large bait clearings. A mechanic proceeded to repair the machine and worked into the early darkness hours. When the field was first checked deer were not present and had not disturbed the bait. The next morning at dawn a good many of the bait troughs showed some use and a few were empty. Five dogs were discovered eating on the carcass of a freshly killed deer. Tracks and signs in the baited field indicated that at least these five dogs had spent most of the latter part of the night in harassing the partly drugged deer. No other mortality was found.

Noble (Noble 1964), from Mississippi, tells of an incident where a drugged deer was killed and partly devoured by bobcats.

PRE-BAITING

In my opinion a well-planned pre-baiting program is as essential to large scale success as is the selection of the deer herd to work with. If the site requirements are met where deer already tend to concentrate, as in a field of winter wheat or in soybean stubble, pre-baiting requirements are lessened. Even here, however, pre-baiting is necessary for a good operation.

We place small scoops (about $\frac{1}{2}$ cup) of shelled yellow corn on dry places along deer trails around the desired site, and distribute additional small piles within the area. As soon as deer use is noticeable, small portable wooden troughs (fig. 1) or trays with drain holes are used.

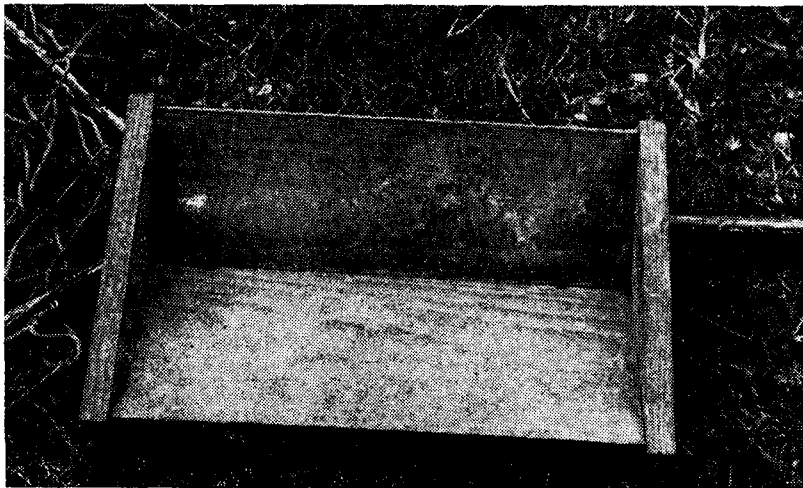


Figure 1

Any shallow papier-maché or plastic tray can be useful as a substitute for wooden troughs. Twelve inch by 14" heavy felt paper was used to improvise trays. The corners of these were creased for $2\frac{1}{2}$ " and stapled with an office stapler.

Without set guidelines to go by I have concluded that about two feed containers per animal is desirable in tranquilizing deer. A few

large feed containers serve only to fill the dominant members of the herd while lower order deer get no feed. This type baiting provides no incentive for low order animals to rush out to the feed trough each time it is filled, because all of the feed is consumed before the higher caste deer allow them to approach. We use two troughs per deer, with troughs 20' to 30' apart in rows 50' to 100' apart. All of the animals in the herd can get some of the feed frequently enough to keep them coming back each day.

Once pre-baiting has been started we attempt to offer feed each day just before dark. This has been impossible in some cases and we have decided that once deer are accustomed to welfare feeding brief interruptions in the feeding program do not do a great deal of harm to a tranquilizer operation if promptness can be practiced the last five or six afternoons prior to treatment.

APPLICATION OF TRANIMUL TO FEED

Treatment of the four deer pens was accomplished by dusting powdered Tranimul on diced apples or by mixing directly with commercial cattle ration. All of the wild deer were drugged by using shelled yellow corn coated with Tranimul.

We have purchased shelled corn for pre-baiting from several sources. All of it has contained various debris such as bits of cob or shuck and broken and immature kernels. This is acceptable for feeding but we avoid use of corn of this type for treating. Ear corn is purchased and the small irregular gains from the top of the ear are eliminated by chopping off that portion with a hatchet. The corn is shelled and winnowed several times to allow the chaff to blow away. The whole regular kernels of corn are best for treating since deer can be expected to eat all of the treated corn. Trash that is coated with Tranimul is sometimes left uneaten and chaff coated with Tranimul works to the bottom of a container in transit and also tends to blow away when an attempt is made to salvage uneaten corn that has been treated. This is purely an economical measure to prevent the waste of the tranquilizing agent.

To coat Tranimul to corn I use a paste made of plain laundry starch. This paste is made by dissolving two slightly heaping table-spoons of starch in just enough cool water to make a thin solution. This is stirred into one cup of boiling water, and the paste is stirred occasionally as it cools to prevent formation of a film. This is adequate for 10 to 12 grams of powdered Tranimul.

Tranimul is added to the cooled starch paste in a large stainless steel mixing bowl. A big kitchen spoon is used to cream out the soft lumps of Tranimul against the sides of the bowl. This is very important for good sticking and at least ten minutes are required to work 60 grams of Tranimul into five or six cups of the starch paste.

The Tranimul-starch mixture is added to about nine tenths of the corn in a metal container. The paste is distributed over the corn by working it from the center outward. The reserve corn is used to pick up paste from the sides of the mixing bowl. When the paste on the corn becomes tacky, the corn should be spread on a metal or plastic sheet to a depth of not more than two inches to dry. An electric heater equipped with a fan is very useful to hasten drying in humid weather.

A word of caution about storage is in order—I had a quantity of treated corn to grow a heavy mold due to condensation of water vapor on the sides of the tub. Metal storage containers should be avoided where considerable temperature changes are anticipated.

DOSAGE RATES

We aimed at getting three grams of Tranimul on a quart of shelled corn or in a quart of commercial stock feed in the case of penned deer. We seldom have been able to get a quart of treated feed into a single deer. Our last and by far the most successful operation, considering the per cent of the available deer handled, came from applying only two and one-half grams to each quart of corn. We

are unable to attribute this success to the reduced rate of treatment since we allowed much time to elapse before the capture effort was begun. The 12 deer captured, plus at least two other deer and numerous rabbits, had consumed only 10 quarts of the treated corn.

CAPTURING DEER

In a typical successful capture operation, the treated feed is placed out just before dark by the same person who has been feeding the deer.

In most of our operations we have checked the site within two to three hours after the treated feed is put out. In one instance where dragline work and free ranging dogs interfered, we checked four hours after the treated feed was placed and again nine hours after feeding. As previously mentioned, we had very good success in one instance when the site was not checked for seven hours. In this case only 15 deer were known to be using bait. Twelve of these were captured and two others barely escaped capture.

Catch crews are made up of three or four men. All are equipped with good quality battery-powered headlights. Each crew has at least two catch nets. Different crews are assigned routes in such a manner that the whole area is thoroughly searched.

One man in each crew uses his light to look for drugged deer. He indicates by direction of his light beam which animal will be approached. The other men walk on each side and some distance from him, staying out of the beam from his light. The deer is approached by walking rapidly toward it while the light is on. If the deer is prone, it can usually be captured before it can regain its footing. The moment a prone deer begins to scramble the catch crew sprints toward it. The catch net is placed over the head and fore end.

Standing deer are approached rapidly but quietly with the light man careful not to show the net in the beam of light. Some standing deer are netted and pulled down. Most will attempt to run and take an awkward tumble, at which point the best capture opportunity occurs. A sudden change in direction toward one of the flankers sometimes presents an opportunity for a net capture. A spirited but quiet chase is in order for a short distance. Excitement of the chase hastens the deer's recovery so that usually by the time 50 yards are negotiated without a fall, it is best to look for a more heavily drugged animal.

We have had some experience with several prone deer lying very near each other. In some cases one or two men tie the first deer captured or one of them merely holds it under a net while other members of the party put nets over other deer. Talking is avoided during capturing and tying.

Most of the deer that avoid capture the first effort are able to escape subsequent efforts. A few, however, will run a short distance away from the lights and stop. A portion of these can be captured later. Sometimes they will bang into a fence or fall in a ditch that an untreated deer could easily cross.

THE NETS

Our net frames (fig. 2) are made from thin wall electrical conduit. A 10' length of $\frac{1}{2}$ " conduit is used for the hoop. The handle is made of a 5' x 1 $\frac{1}{4}$ " piece. I make a pattern from soft 9-gauge wire and trace this pattern on the shop floor. Standard conduit benders are used to shape the hoop. A $\frac{1}{4}$ " diameter hole is drilled through the handle and through each end of the conduit making the hoop. A $\frac{1}{4}$ " stove bolt is used to stabilize the hoop to the handle. The net is made from 3-16" braided nylon with a 4 or 5 inch bar mesh. Our nets are 3 $\frac{1}{2}$ to 4 feet deep.

We have made and used two 50' x 5' nylon nets as portable deer fences. These have not helped any capturing operation enough to justify their continued use.

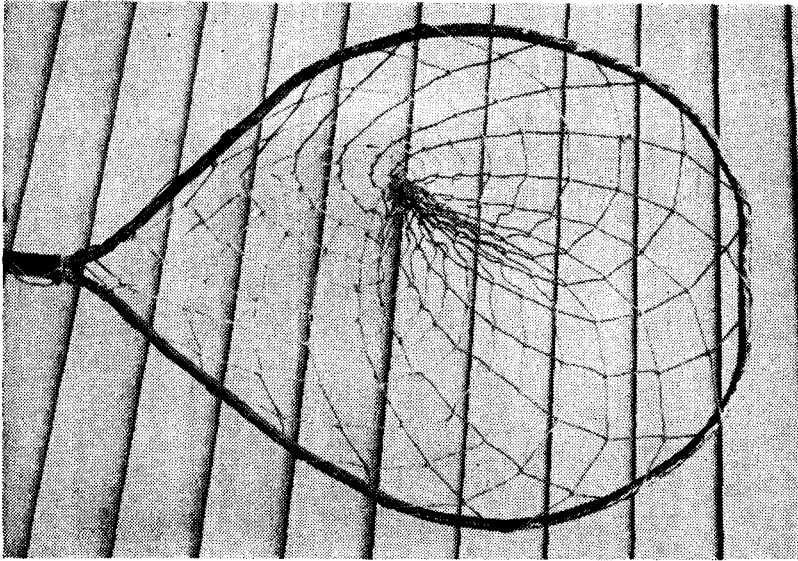


Figure 2

TYING DEER

We have experienced a great deal of difficulty in tying deer in the past. One of our problems has been with tied deer escaping their bonds. Another problem has been damage the deer can do to their lower limbs while struggling with ropes or twisted straps. This is especially apparent when slack in the bonds allows some movement.

We avoid the use of nylon since the lack of friction on touching surfaces makes it very difficult to keep slack from the wraps. Ropes are avoided because they cut into the deer when pulled tight. Our most useful tying straps have been made from $1\frac{1}{4}$ " woven cotton webbing that was acquired from military surplus. Another good strap has been made by cutting $1\frac{1}{4}$ " strips from heavy tarpaulin material with pinking shears. Strips ripped or cut smooth from this material tend to unravel at the edges making tying very difficult. The woven cotton straps can be used dozens of times while the tarpaulin straps are good for only a few ties.

The person tying the deer straddles the chest area while the animal is positioned right shoulder up. The hind legs can be secured by one or more other men as needed. One man can usually extend both hind feet back and push with one foot against the rear of the large muscles of the back legs. This is best done while keeping the face away from the reach of the hooves at all times.

The person tying can immobilize back feet of small deer with pressure on the front of the deer's thighs with the sole of his right boot. His left knee should be on the ground about the point of the shoulder.

Two wraps are taken on the right foreleg (fig. 3). The left foreleg is pulled parallel and tied with the next two or three wraps (figs. 4 & 5). Throughout the tying considerable pressure is maintained on the free end of the strap, which is kept rolled in the palm of the right hand, while the left hand presses against the forelegs. While keeping the strap tight the left hind leg is placed between the forelegs on the body side of the strap. The back leg is wrapped two times on the distal side of the junction and one time on the body side (fig. 6). The right hind leg is then brought parallel to the left hind leg where they are bound together using the remainder of the

strap. The last few inches of the end are tucked under the next to last wrap and drawn snug. (figs. 7 & 8)



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7

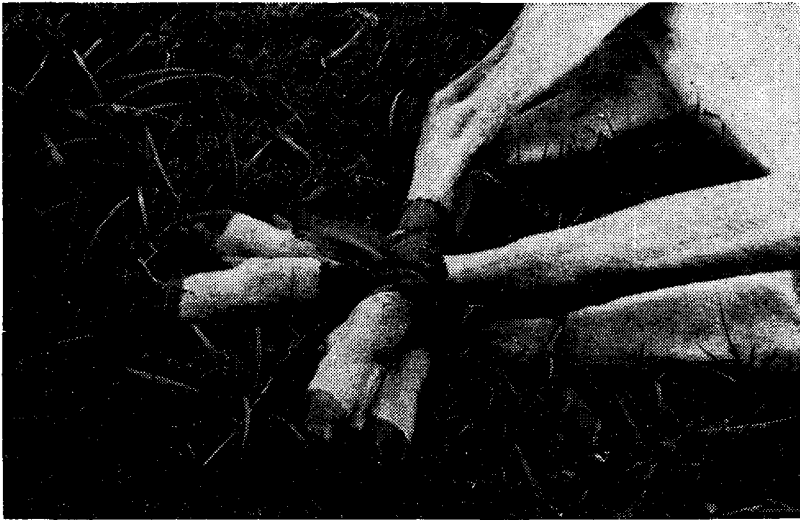


Figure 8

A six-foot strap is adequate for all but very large deer. A few seven-foot straps can be available for larger animals or two shorter ones can be joined. We avoid knots and twists in the straps as much as possible. As deer are untied straps are rerolled and the roll is secured with a rubber band. A supply of rolled straps can be transported in jacket pockets.

The feet are noticeably cooler within 30 minutes after tying. Some deer tied up for an hour temporarily lose the use of their forelegs. For this reason we aim at untying deer within an hour. In sub-freezing weather freezing of the feet may result from leaving deer tied too long. We have worked in $+22^{\circ}$ F. weather with no apparent damage to the feet.

TRANSPORTING DEER

We have tried sleds made from automobile hoods and have packed deer in our arms or over our shoulders. We have learned that it is important to get the hauling truck as near to the tied deer as possible. For the inevitable carrying that is present on most capture efforts, we have improvised a litter. This is done by tying up the bag in a catch net and placing the deer on the net. Up to four people can walk comfortably while holding to the hoop. (figs. 9 & 10)



Figure 9



Figure 10

LIGHTS

Any dry cell powered light weight head light is adequate. I find it useful to carry the dry cell in the shell pocket of a game bag and attach the wire to the shoulder straps of the bag to prevent

snagging. The other shell pocket and game compartment are useful for carrying tying straps, extra bulbs, notebooks, etc.

HAULING

We use one-compartment deer hauling crates on ½-ton trucks and carry six average deer. We have the driver check them frequently to be sure that none are penned down flat by larger deer and that all are reclining in good position. Since these crates open from either end, we occasionally pull the crate away from the cab end of the truck so that we can reach in the front door to move deer around for better position.

The delivery haul is usually begun the morning after capture and if the weather is warm the driver is instructed not to stop the truck while en route unless a shaded area is available. Ventilator holes in the crate assure a good flow of air as long as the truck is in motion.

RELEASE AND POST RELEASE CARE

By the time the release site is reached most of the deer recover their equilibrium and are able to bound away. Others have to be dragged from the truck and will stagger off a few yards and lie down. These deer should be stimulated to rise and encouraged to walk or run. They should be made to get up several times each day and when they are allowed to lie down again they should remain right shoulder up. Forced exercise should be employed as long as the deer can be caught. Recovery is usually complete by the second day, but we have had an occasional deer to remain unable to walk until the third day.

MORTALITY

During the fall of 1964, I lost all four deer that I moved from two pens. These deer, two adult bucks from one pen and two does from the other, were transported in the bed of a truck with their feet bound. The haul was about 11 miles over rough roads. Three of the deer were dead by the third morning and the fourth was shot by the owner. The described symptoms indicated foreign body pneumonia. I was unaware of the mortality until after it was over. Other bucks, does, and fawns, in each pen were drugged in the operation. Several other deer were handled and photographed. One other deer in each pen was briefly tied in the event we would have been unable to catch the individuals the owners wished to swap. The complete recovery of all of the other deer leads me to incriminate the transportation of bound deer in the bed of the truck.

Twenty-five captive deer were subdued in two pens in order that blood samples could be taken. Six of these deer were hauled away in conventional hauling crates and all survived. Our one mortality here came from a decision to destroy a large buck that had lost all of his incisors in a collision with a post.

Of the 112 wild deer handled, we have lost two directly. One large male fallow deer died en route to the release site, apparently of strangulation, and one fawn was pinned down and apparently suffocated by a larger animal that was thoroughly drugged. Two known losses have followed releases of wild native deer. One was partially eaten by dogs and may have been killed by them. The other was badly decomposed when found but still intact. Since considerable post release follow-up inspections were made, it is unlikely that many more animals were lost. The native deer that was caught and partially eaten by dogs at the treatment site is our fifth known mortality and is not included in the count of 112 wild deer we have handled.

RESEARCH NEEDS

I have lost some Tranimul in salvaging treated feed. The laundry starch becomes brittle and portions of it flake off as the feed is poured back into a carrying or storage container. The flakes, along

with some of the powdered Tranimul, work to the bottom of the container while in transit. Upon reuse, the material from the bottom of the container has much more Tranimul than does the corn throughout the remainder of the batch. Other than this the starch is very good. It is readily accepted by deer and it dissolves rapidly after it is ingested. There is a need for a similar sticker that does not dry into brittle film. Such a development would not only save some Tranimul but would assure more uniformly treated feed when salvaged material is used.

While many deer have made good recovery by the time they are released, some have remained virtually helpless into the third day. These animals are vulnerable to predation and require stimulation and movement to avoid pneumonia. A solution to this problem would be the development of a safe drug that countered the effects of Tranimul. If such a substance could be given by hypodermic injection it would be needed only on those animals that remained in the vicinity of the release site.

The aspiration of rumen content or saliva is always a hazard in drugging deer. This is lessened by proper handling of the subjects. The use of massive injections of an antibiotic should be tested as a method of assuring the recovery of especially valuable animals.

SUMMARY

With experience gained from previously reported work and additional experience with captured deer, a deer capturing program was undertaken. A total of 112 white-tailed and exotic deer were live captured. Total mortality was four of these 112 deer that were captured, and one additional deer that was found to have been killed by dogs near the bait site.

Site selection, pre-baiting, control of competing and predator animals and disturbance by man are judged to be essential to a good operation. Catch nets are very useful in the capture of some deer. Proper tying, handling, and hauling, as well as post release observation and care are important to the welfare of the deer.

CONCLUSION

Use of the drug Tranimul is superior to other deer capture methods in some situations. It works equally well with white-tailed deer, Sika deer or fallow deer.

The presently used technique yields a good return of deer per effort expended.

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