

# THE PERFECT SEQUEL by Louise Young

Below is the text of a prepared speech delivered by Dr. Louise Young in Canton, N.Y. addressed to those brave people who have stood in opposition to the construction of a 765 K.V. powerline through Northern New York. Louise Young's book Power over People, published Oxford Press, details the efforts of Ohio people who also opposed construction of a 765 K.V. powerline through their homeland.

Thank you, Mr. Reimer. I am delighted to have the opportunity to speak to the UPSET Group, their friends, and neighbors. I have been following with great interest the accounts of your fight here in the North Country against the 765kv line which is scheduled to pass between Ft. Covington and Marcy. Your story is the perfect sequel to my book. All the characters and characteristics of that earlier fight are reincarnated here. If I had been writing a work of fiction I could not have dreamed up a more appropriate second volume. Even the title Power Over People is devastatingly descriptive of your experience.

The arrogant attitude of the people responsible for erecting these transmission lines has been outstanding here. It was also what triggered my feeling of outrage and led to the writing of my book. About eight years ago Ohio Power Company announced that they intended to build a high voltage line across the farm in Ohio where I grew up and which has been in my family for seven generations. This decision was undoubtedly made a number of years before I heard about it in an office of American Electric Power Company when an executive put a straight edge across a map of southern Ohio and drew a line from a little town named Cheshire on the Ohio river to a substation near Columbus.

For several years the plan was a well-guarded secret. It was very important that no advance knowledge should alert people along the intended right-of-way; there must be no opportunity for community action opposing the erection of the line. But each piece of property was photographed and plotted from the air. The route representing the greatest economy had been precisely determined and drawn up in detail. All that remained then was to notify those concerned and force as rapid a settlement as possible.

The agents worked in groups. Armed with their drawings and contracts they fanned out across the countryside on the appointed day. Adjoining farms were approached simultaneously in order to maximize the surprise element and to minimize the possibility of neighbors consulting with each other. Tempted by the payments offered in compensation - although these payments were actually very low - a number of farmers signed on that first day. Others held back postponing the evil moment. They were far-sighted enough to understand that the sum of money they would receive would be spent in a short time but the transmission line would be there for their lifetimes, perhaps for their children's and grandchildren. The ones who held back benefitted financially in the long run. Several of them were paid seven times as much as they had originally been offered.

Our first reaction when the agent approached us was concern about the destruction of our unusually lovely view. Our farm was in an unspoiled rural area. From the house we could look out over many miles of fields and woods unmarred by highways, billboards, or housing developments. The electric line was routed diagonally across this landscape. Consulting with our neighbors we discovered that the visual damage would be much less for several farmers on either side of us - as well as ourselves - if the line could be moved a few hundred feet to the south and when laid out on a large scale map there was no perceptible difference in the length of the route. We wrote a letter to the Vice-President in charge of construction and engineering for the power company asking if we could discuss this very small change in routing with him. The answer we got back was that he would not discuss it - company

engineers had flown over our farm and had decided what was best for us and our neighbors. As a right-of-way agent remarked to us, "A billion dollars would not move this line one foot."

We fought the Ohio Power Company through legal negotiations for almost three years and finally settled out of court because at that time the laws of Ohio did not allow citizens to raise any issue in court other than the value of the land appropriated.

The line has been erected now across our farm. The towers are giant steel skeletons standing 130 feet high like twelve story buildings. Thick steel and aluminum ropes swoop in giant curves against the landscape. "You'll get used to them," say the power company executives, "Pretty soon you won't notice them anymore." And the really frightening thing is that this is true. The ability to look without seeing is becoming part of the adaptation we are all making to a rapidly deteriorating environment. We look around billboards, and over superhighways and under transmission lines and pretty soon we don't really see at all any more. As Rene Dubos has observed, "Man is able to adapt to almost anything. This is the real tragedy... As we become adapted we accept worse and worse conditions without realizing that a child born and raised in this environment has no chance of developing his total physical and mental potential."



(Standing in the right-of-way in front of an elm tree, photo Doug Jones)

The electric companies pay lip service to important ideals such as preservation of natural beauty and concern for the total environment. One of the latest additions to the vocabulary of their public relations experts is the word "beautility." I have never seen a definition of the meaning they attach to this work - in fact, I am not sure they would want to really define it. They prefer to allow it to suggest the pleasant thought that in electric installations beauty and utility exist side-by-side with equal attention paid to both. In reality, however, utility gets the lion's share and beauty is served a few crumbs. For example, painting transmission towers azure blue is considered to be a good illustration of beautility - an ounce of beauty to a ton of utility.

But "Beauty is in the eye of the beholder" the power company executives like to remind us and by that they mean to imply that beauty is too relative a concept to have any real meaning. But I read that phrase differently. Beauty is in the eye of the beholder - it is also in the mind and spirit of the beholder. The things we see and experience every day - the landscapes we live with become part of us. Ugliness is in the eye of the beholder also and the person who experiences ugliness every day of his life grows that way. Unfortunately there are no laws in this country to protect us from the spreading blight of ugliness.

It is conservatively estimated that one hundred thousand miles of new transmission lines will be built in the U.S. each decade between now and the turn of the century. Three hundred thousand miles of lines is comparable to criss-crossing back and forth ninety times from coast to coast.





(Photo from Seabrook, N.H., by Bob Ballan)

This network of lines will enmesh your land like a vast spiderweb, and lovely rural landscapes like yours with rivers and lakes and wooded hills will be lacerated by these lines even though you are not the ones who are demanding all that additional power.

One 765kv line is capable of carrying enough electricity to provide the average needs of a city the size of Chicago. This enormous flow of energy is carried on bare conductors that pass overhead, in some places no more than 40 or 50 feet above roads and farms. I find it comes as a surprise to some people to learn that the wires that carry these great amounts of power are not insulated. In fact, no transmission lines are insulated like the electric cords in our homes. The theory is that air is a good insulator, and this is true up to a certain critical voltage gradient. Beyond this point any increase in voltage or imperfections in the line cause the air to break down as an insulator and electricity is discharged into the air. I have a good friend who when I described this effect to her said - Oh, I see, it's the loose

juice problem! Well, you can think of it that way if you like - some juice is being spilled all the time into the air along these transmission lines and when the weather turns bad - in rain or snow - a lot more juice is spilled than in good weather. Most of this spillage could be avoided if the lines were built bigger and heavier to carry this same amount of power.

The discharge of electricity into the air - sometimes called corona discharge - is both audible and visible. At night particularly in bad weather there is a continuous hissing, crackling sound which in rain or snow becomes a loud roar. Noise levels up to 70 decibels have been recorded. I have talked to people who say that they are often awakened up at night by the noise from the line. Another annoying effect is the interference with radio and television reception. Because most rural areas are far from the radio and TV stations the signal strengths are relatively low. For good reception in these areas interference levels must be kept low. But the design standards used by power

company engineers are not adequate to assure that rural residents will be able to enjoy acceptable radio and television, especially in bad weather. In effect, country people are being treated like second-class citizens as far as their right to be free from interference is concerned.

One of the most serious effects caused by the corona discharge is the creation of unusual forms of the molecules which are normally present in the atmosphere. The air around the conductors becomes a veritable seething cauldron of chemical activity and some of the chemicals formed are considered to be particularly damaging to living things: ozone, singlet oxygen, and hydroxyl radicals. We really do not know what concentrations of these chemicals accumulate under various weather conditions and therefore we are unable to estimate their biological significance. These questions have not been adequately researched.

It is a strange and awesome sensation to walk under a fully energized 765kv line - the hair on your arms stands up - there is a feeling of stimulation and tension in the air like the atmosphere just before an electric storm. These effects are caused by the strong electric field between the line and ground. This field can be felt in the daytime and at night it can be made visible by holding an ordinary kitchen-type fluorescent bulb in your bare hand and walking out under the line. About a hundred and fifty feet before you reach the edge of the right-of-way the bulb lights up and glows brighter as you approach the line.

In a sense everything around these lines is plugged into electricity. There are small currents running all the time in the ground, the bushes, the animals, the farmer on his tractor. These effects extend considerably beyond the right-of-way. Many people have their backyards, their children's play areas, the fields where they work for many hours a day in regions where light bulbs will light up in your bare hand.

I knew about the magnitude of this effect in theoretical terms when I wrote my book and was concerned about the health of the people who must spend much time in such an unnatural environment. But I was unable to find much information about it in the published literature. Then about eight months after the first edition of my book had come out, I received, in the mail, a copy of a paper that had been given at an International Symposium of high voltage engineers in Paris a year and a half earlier. This symposium had been attended by several prominent members of our electric industry. Copies of one of the speeches had subsequently been passed around members of the electric industry and this one copy had been sent to me by an electrical engineer who had read my book and agreed with most of what I had to say.

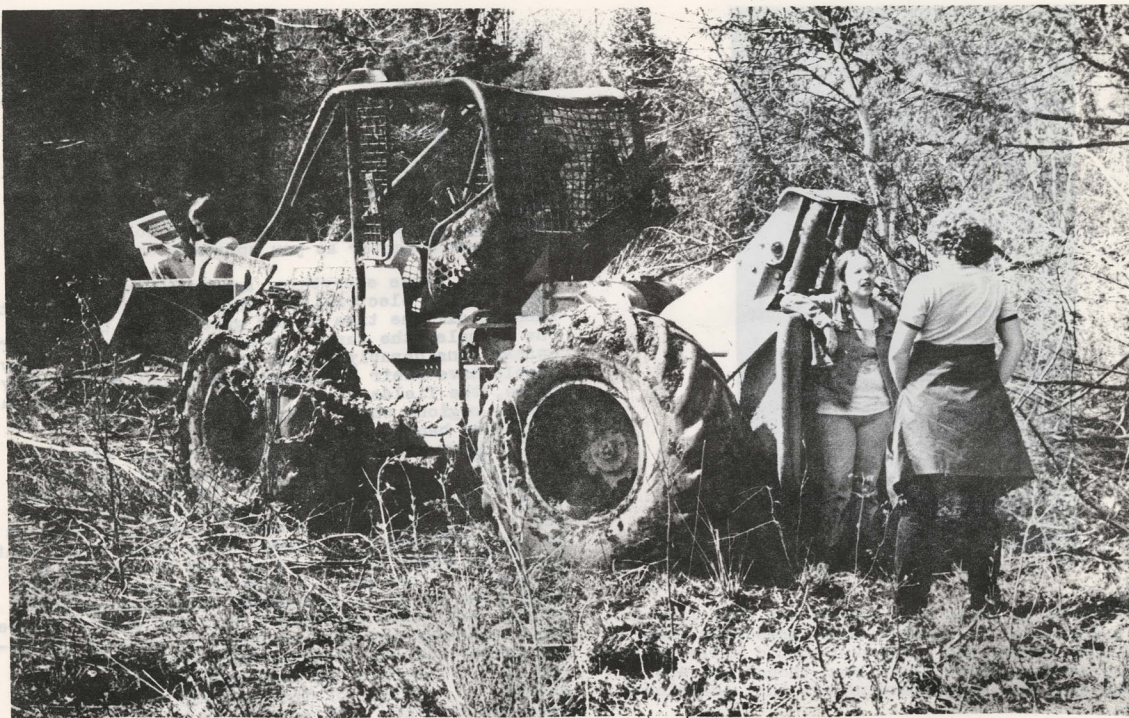
The paper described research that had been done in Russia. In the early 1960's after their first 500kv lines were energized, workers at the substations began to complain of headaches, unusual fatigue, and sleepiness. In response to these complaints, the Soviet government conducted a long-term study of the health of substation workers comparing those at 500kv substations with workers at lower voltage substations. The conclusion drawn from the study was summarized in the following words: "Long-time work at 500kv substations without protective measures results in shattering the dynamic state of the central nervous system, heart and blood-vessel system and in changing blood structure. Young men complained of reduced sexual potency." As a result of these conclusions the Soviets have set up safety standards for maximum exposure of their workers to strong electric fields. The fields which they consider dangerous are fields that exist on the right-of-way of our 765kv lines.

Some studies here in the United States have produced evidence that corroborates the Russian findings although our researchers have been severely hampered by the fact that almost all the funding for conducting this work comes from the electric industry. Unfortunately, human nature being what it is - it would be unrealistic to expect that any information obviously detrimental to the electric industry would come out of such research.

I will give you an example to illustrate my point. The Electric Power Research Institute which is totally funded by the electric industry has been financing a number of studies on the biological effects of electric fields. One of these was a research project conducted by a Professor of Surgery at Johns Hopkins Medical School. Taking his cue from the results reported by the Russian scientists, he designed an experiment which would test some of the involuntary responses that are controlled by the nervous system - such as blood pressure, pulse rate, temperature etc. In his first experiments he exposed dogs to fields of 15kv/m for five hours. This is just slightly more than the maximum fields that can occur at ground level under the 765kv lines now in operation. He found a significant increase in the arterial pressure and pulse rate of the dogs that had been exposed. This research project, however, was not brought to completion and the results have not been officially reported because the grant supporting the work was abruptly terminated by the Electric Power Research Institute.

You have heard, I imagine, of the experiments performed by Dr. Marino and Dr. Becker at the Veterans Administration Hospital in Syracuse. These experiments on mice showed significant decreases in weight gain and changes in blood chemistry after





(Construction stopped in the town of Canton, St. Lawrence County, photo Doug Jones.)

exposure to fields of this same strength - 15kv/m. Dr. Marino and Dr. Becker are in much the same position as the researchers at Hopkins - they have not obtained the funding they need to conduct a really definitive follow-up study.

I have examined the reports of the various research projects on the biological effects of electric fields, and considering all the evidence, I think it is fair to say that repeated or prolonged exposure to these fields do probably affect biological organisms and they may be detrimental to human health in the strengths encountered under 765kv lines. Safe limits have not been defined and until they are, exposure to electric fields should be kept as low as possible.

In addition to the dangers from currents that run all the time in the bodies of people near the line there is the danger of receiving a bigger jolt of current by touching a metal object in the field. If a large metal thing such as an automobile or a tractor is insulated from the ground (by rubber tires, for instance) a charge collects on it. Then when it is suddenly grounded - by a person touching it - a current flows through the person to the ground. If the current is large enough, the person is not able to release his hold on the conducting surface and current continues to flow through his body. The threshold of danger is determined by the current a person can tolerate when holding the charged object and still be able to let go of it using the muscles directly stimulated by the current.



("the fight against the line will sure be hard," photo Doug Jones)

Articles published by electrical engineers in professional journals show that it is theoretically possible for a person coming into contact with a large vehicle or a long metal object such as a pipe, a fence, or a gutter under a 765kv line to experience currents exceeding an adult's safe let-go threshold. For a child the hazard is greater. For a person wearing a pacemaker or carrying a metal pin in his body the danger is greater still. Yet utility companies do not warn property owners of such dangers. In fact, they state that there is no hazard, that these shocks are "similar to touching a doorknob on a cold day."

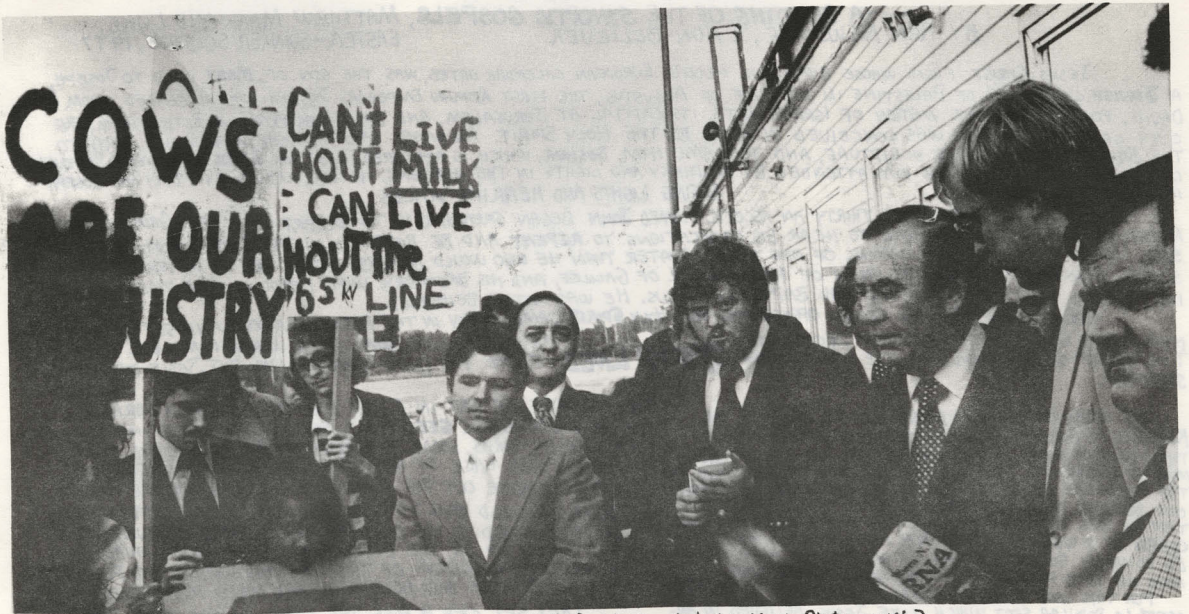
The companies hope to avoid serious accidents from these shocks by grounding all metallic objects in and near the right-of-way. But grounding can become damaged, or removed, and any vehicles or machinery that do not normally belong on that piece of property could create a hazard when parked or operated under the line.

The engineers who represent the power company's point of view say it is unlikely that all the conditions would occur simultaneously which could allow these maximum shocks to occur. But I believe they have no right to count on good luck in planning to prevent serious accidents. Safety laws are normally made with a large safety margin and this principle should apply in this case, also. The American National Standards Institute has adopted a standard of one milliamp for the maximum shock to which people can be exposed from household appliances. But shocks exceeding 6 milliamps can be obtained from touching large vehicles parked under a 765kv line.

I have talked to a number of people who have had frightening experiences under these extremely high voltage lines. One man said he was unable to paint his aluminum-siding house because of the shocks received through the brushes. Although all houses near a line are elaborately grounded, several residents complained of shocks from the plumbing when they turned the water on or off. One man said he hadn't taken a bath for a month because he didn't like getting shocked in the bathtub. Two women dreaded to go to the bathroom because of the shocks received when they sat on the you-know-what.

One landowner attempted to install a gutter on a barn about 200 feet from the right-of-way and was almost knocked off his ladder by the shock from the barn roof. The building had been grounded already, but the power company attempted to correct the problem by more careful grounding. When these efforts were not successful, the company turned off the voltage on the entire line so that the gutter could be installed on this barn. Later, this same man attempted to paint his barn roof, but the electric shocks were so frightening that he was forced to give up the project. The power company, of course, was not about to turn the juice off again; they suggested that he ground himself by





(North Country People greet Gov. Carey with makeshift signs, photo by Mark Pietrowski)

tying a chain around his ankle and dragging it behind him on the barn roof.

Another very interesting episode involved a man who owned riding horses and found that he was unable to use them after the line was energized. Both horses and riders received severe shocks when they passed under the line. The horses jumped and shied, and the riders always got a jolt when they dismounted near the line. The power company sent engineers to investigate the complaint. They experimented with making special insulated reins, saddles, and bridles for the horses. Then they suggested that the farmer ask one of his children to ride under the line to test the effectiveness of this insulation. The farmer looked at the power company representative and asked, "How many children do you have?" "Three," answered the representative. "Well I only have two," said the farmer. "Let's use one of yours."

The problems caused by the 75kv lines are just the beginning. The electric companies are planning to go to much higher voltages in the very near future. A multimillion dollar development program is currently in progress on overhead transmission lines that will carry a million or even two million volts.

I do want to emphasize, however, that it is not the high voltage in itself that is responsible for many of the "side-effects" created by these lines. Transmission at high voltage does provide an efficient way of moving electricity and it is possible to design lines that would carry these enormous voltages with much less danger and pollution. Corona discharge could be reduced by using larger and more numerous conductors. Danger of electric shock and exposure to electric fields could be reduced by increasing the height of the lines. Already some improvement has been achieved. The first lines built in Ohio have a minimum height of 40 feet above ground. The line that is planned here will have a minimum height of 48 feet, thus reducing the electric fields by about 25%. This is some improvement but it is not enough. If we must have these big overhead lines they should be designed to produce minimum impact on the people living nearby.

Another way in which the detrimental effects can be reduced is by careful management of the rights-of-way. In Russia the region where electric field strengths are greater than 2kv/m is clearly defined by signs. No recreational activity is allowed within this zone. No car, truck, or piece of farm machinery may be stopped or refueled within this zone. If a mechanical failure occurs the car or tractor must be towed away. Farmers are required to have metallic shields over the seats of their farm machinery to help protect them from the electric fields; they are also given special safety instructions. For example, it is recommended that they cross the right-of-way near a tower.

These precautions are taken in a society where human life and human rights are not valued as highly as they have traditionally been in the United States. Our safety standards and right-of-way management should be more conservative than the Russians'. But these improvements will not occur unless maximum pressure is put on our power companies and agencies. An informed public opinion is the best way to bring this pressure to bear.

The protest movement which you have launched here in the North Country has achieved something which no other group of protestors has achieved. By and large throughout the United States the question of the safety of transmission lines has been a neglected issue. It has been passed over lightly by the press and it is unknown to the general public. You have gotten the attention of the media and through them have reached a sympathetic general audience. Most important of all, this publicity has commanded the attention of the power authority. Of course, it is deplorable that in a free society it should be necessary to step outside the accepted means of protest to get a fair hearing. But this is not the first time that civil disobedience has been used to fight an oppressive system. We have only to remember the civil-rights sit-ins and the Boston Tea Party.

In thinking of your situation here I am also reminded of a little story about a farmer who was having trouble training his mule to pull his plow. He had tried everything but still the mule would not turn right when he said Gee or left when he said Haw. Finally one day the farmer went to consult a man who was famous for his ability to handle animals. "Oh yes", said the man, "bring the mule to me and I will train him - the trick is that you must use kindness and gentle persuasion." Well the next day the farmer took the mule to the trainer and the very first thing the trainer did was to pick up a big stick and give the mule a tremendous wallop. "Why, what did you do that for," exclaimed the farmer, "I thought you were going to use kindness and persuasion!" "I am," replied the trainer, "But first I have to get his attention!"

Well, you have used a big stick and have gotten the attention of the Power Authority. Now perhaps reason and legal persuasion can have their day. Perhaps you can convince the state authorities that it is wrong to force across your land an installation whose safety is seriously questioned. This action requires you to accept risks which are not demanded of the rest of the population, in order to provide what is deemed to be a benefit for the majority. I think it could be argued that this violates the Equal Protection Provision of the Fifth Amendment. At any rate it is true that a society based on such a denial of human rights cannot benefit anyone in the long run.

Thank you.