DR. KRAUS: I still think that there must have been some cross movement in the breathing of the cells. I would like to see such an ivy vine. There has been a great deal of controversy as to whether poison ivy is, or is not, killed by 2,4-D. It is a part of the material that is inside and this material may travel for long distances in plants and show no manifestation whatsoever, but it will show up at a distance. For example, if we take an old bean plant, and put this on one of the upper leaves, there will be no indication whatsoever that you can see with your eye, in the stem below it. Frequently, however, this plant dies, and if you look at the roots you will find all of the active growing tissue at the roots, swollen and dying. In other words, this may be traveling through cells and not leave a mark. All I can say is that if that can be put on, it leaves almost no trace. The fact that you do not see a cell change does not mean that the material has not gone through. It is like when someone said, "What is the good of soap in your garments. You don't see soap in your garments." Oftentimes it does a shirt a lot of good.

DR. PAVLYCHENKO: The effect of 2,4-D on roots is significant and was mentioned on several occasions today, but not sufficiently discussed in this upward and downward movement. I, particularly was interested when somebody mentioned that concentrated tissue was formed on sow thistle roots. We found that hoary cress always forms very large nodules, right below the surface, but no other perennial weed showed the same effect. That is one thing I would like to have clarified, if possible. Leafy spurge showed very quickly and consistently that the whole bark was swollen, but not in a form of irregular swelling. The whole root was enlarged in diameter. We sprayed several plants of leafy spurge which were grown alone and we killed it quite quickly in two or three weeks' time, but the new shoots began to appear about three to four weeks after. They all, without exception showed strong effects of 2,4-D, and yet they came out from 18 inches to two feet from the place where the original plant grew. They were curved and bleached and assumed a very reddish discoloration and died. The next crop of shoots came up two or three weeks later and they show much less effect of 2,4-D. Some of them died but some of them went to winter sleep without being killed. The third generation of shoots came up and showed little, or no effect of 2,4-D whatsoever.

Another interesting observation in connection with hoary cress--we watched it closely and found that in every case, hoary cress laterals showed swelling, and the plant still showed life. About twelve inches from the original plant, the diameter was reduced to 1/16 of an inch and the root was growing of normal diameter from that point on. The effect of 2,4-D was marked so abruptly that you could see that little stretch, as a sausage, for some time, and then abruptly, the diameter is reduced and the root is not showing the effect any more. What would be the reason for that abrupt change in the effect?

MR. KEPHART: This discussion could go on for quite a while, but I would like to point out that there is a lot of information and we are so intent on getting some answers to our questions and there are others that we haven't had time to think about, even if we could. I don't know if we have time to go into any more discussion on this, but I want to say that in case any of you are in doubt, Dr. Kraus is the one that started this whole thing. He is the first one to see that these hormone-like materials could be used for killing weeds, so I guess you can blame him, after all. There is one question that I would like to ask Dr. Mitchell. I mentioned a test that we had had down in Beltsville where we treated pasture lands, and I would like to ask him to tell you about this.

DR. MITCHELL: On the first experiment, we treated pasture lands with twice the amount of 2,4-D usually applied and then we pastured sheep and cows on this land. There was no evidence as to the palatability of the grass at the end of two weeks, beyond the fact that the animals had grazed off the grass and they were examined by veteranarians and found no toxic effect.

In the second experiment, we fed a cow five and one-half grams of pure 2,4-D a day for a period of about three months. This was placed in her grain and at the end of that time she had consumed, very willingly, one and two-tenths pounds of 2,4-D. There was no decrease in her milk production and no evident lack of palatability of the grain. An autopsy showed that there were no apparent effects on the various organs. A calf was fed entirely on the milk from this cow for a period of one month, without any ill effects. I think that the Bureau of Animal Industry feels that it is fairly safe to use 2,4-D on spraying pastures.

[redacted]

MR. SIEMS: This morning someone mentioned about waterweed from the South. There have been thousand of artificial ponds that have been made in recent years for the growing of fish. These ponds are artificially fertilized and in order to increase the yield of fish, what effect, if any, does 2,4-D have on the fish when used on the water weeds?

DR. MITCHELL: We don't have any information on this. I think there must be some representative of the various companies in the audience that had experience along that line. Perhaps someone would be willing to tell about that.

MR. BARRONS, DOW CHEMICAL CO.: I saw a gold fish grown for six weeks in 1000 ppm of 2,4-D and it was very lively. The Michigan State College examined it and said that it was healthy. 1000 ppm is greatly in excess of what you would expect to get in a pond.

MR. KEPHART: The effect on pond plants is something different. They exhibit just as much difference in their susceptibility of 2,4-D as terrestrial plants do.

Any more questions on 2,4-D, or do you know all about it?

MR. LUTZENBERGER: I would like to make a commitment on the poisonous nature of 2,4-D as far as grazing animals is concerned. In our leafy spurge work, we had 22 horses grazing in that pasture all the time while this work was being conducted, and in addition to the 2,4-D, we had some chlorate treated plots and the horses seemed to want to stay in that area and apparently there were no ill effects from it.

DR. WILLARD: We asked our Veterinary College to conduct some tests. We are too poor to use much stock for awhile. He started with guinea pigs and with the Sodium Salt. All the stuff we could get into the guinea pigs didn't have any effect on them.

MR. KEPHART: Anyone have a case where a human was injured by 2,4-D?

MR. JONES: I got a call from St. Louis for a woman who had just swallowed a glass of Weedone Emulsion. This woman had been using this glass for measuring this material and she put it under the tap and had it down before she realized that it tasted queer. I asked them to report if anything unusual happened.

There was another case in Chicago where a Doctor drank a glass of it, and he was using the stomach pump. Another case, a woman broke a bottle and got her hand fairly well scratched, and got the emulsion over the cut. She washed it off and we kept in touch with her physician. There was no reaction.

DR. KRAUS: I have personally taken one-half a gram of pure 2,4-D a day for three weeks. You judge the results.

MR. KEPHART: The matter is closed, and the question is settled. I would like to tell an experience I had. A very perturbed voice would say when the phone would ring, "We have some weeds in our yard and we want to use some of these new hormone weed killers." She stumbled along, and then she finally said, "I am a little worried --that word hormone means a lot of things," but I don't think it does in this case. I wish Dr. Mitchell would explain what he means by the word hormone with these compounds.

DR. MITCHELL: I think maybe I should call on Dr. Kraus when he used this for growth regulators.

DR. KRAUS: The reason that I had proposed some years ago that we use the term "growth regulator" was that when these things started out, they were called "growth stimulant" but they did not stimulate growth, they suppressed it. Therefore, it was inappropriate. I have been looking at these things as a traffic policeman. In other words, these substances regulate what a plant does and it seems to me that we could say that they regulate growth.

MR. KEPHART: We don't want to take official action at this Conference as to the continued use of this word Hormone, but if we do use it, we are using it for something that it isn't.

MR. MCDONALD: As long as we are talking about toxicity, we did make a very interesting observation this summer. We were doing our best to get some slides on