

DR. STOLWIJK: This is something that also occurs in workers with infrared and is related to a defect in the lacrimal glands. It is a dry eye phenomenon and is cause to remove workers from that sort of environment. They are going to be very displeased with that environment and continue complaining, and there is nothing that can be done about it. There is some small number of workers that has a problem with insufficient tearing. If they do not get enough tearing, they become sensitive to a fireplace or similar things.

MR. CURTIS: That could possibly be a thermal effect.

DR. STOLWIJK: Yes.

MR. CURTIS: Some of these workers actually feel very hot where they might have a metal pin implanted in their leg or something of that nature.

DR. STOLWIJK: Yes.

MR. CURTIS: Or an implanted copper IUD.

DR. STOLWIJK: Yes. At that frequency you would expect anomalies of that nature around metals. That could easily happen. At that frequency pacemakers and similar things are even more likely to develop serious problems.

MR. CURTIS: If a man can actually feel his legs getting warmed up, are we talking about the sensing mechanism? Would that also be internal besides being external?

DR. STOLWIJK: The sensing mechanisms are not only in the skin, but also subcutaneous. There may also be sensing mechanisms in the veins that drain the legs. People have found sensitivities there. It could be in a number of different ways. If it is a metal pin the entire length of the pin would get warm due to its own very high conductivity. So any sensors anywhere along the way would signal that.

MR. SWICORD: It might be interesting to hear your ideas about the investigations that are needed to answer some of the questions raised today.

DR. STOLWIJK: I think that some description of the biochemical and enzymatic changes that result from temperatures that are above physiological would be useful. Unless this activity becomes the client for it, I do not think it is going to get done because there is no other client for it and it does not pose sufficient fundamental challenge so that the basic research operations would be interested. It is also quite clear that if theoretical models report that there are heavy concentrations at lower frequencies, then experimental confirmation of that would be heavily indicative because those are troublesome. We are much more used to having high levels of that in various places. It has been around longer. If these concentrations really do occur, why did we not get complaints around induction heating and capacitive heating units which must have leaked?

DR. DUKES-DUBOS: We did get those.

DR. STOLWIJK: Oh, do you get those?

DR. DUKES-DOBOS: Particularly sexual libido.

DR. STOLWIJK: But, you should have received those complaints in the 1950's before any of this became controversial. You should have had these complaints and they must be on record somewhere.

MR. JANES: It is apparently a geometrical resonance phenomenon, so it occurs roughly at frequencies or wavelengths that are about half the body length.

one needs to be concerned. I would specifically worry about those tissues that act like your phantoms and do not have perfusion.

MR. JANES: The phantom has been done to identify sites of absorption and give an input distribution. Then the heat input is handled by model systems.

DR. DUKES-DUBOS: It is important to clarify the point that if a person is exercising at a certain level in a certain environment of heat and then microwave radiation is added to that person whether this would alter the inflection point or the upper limit of prescriptive zone.

MR. CURTIS: The man climbing a 900-foot tower has a lot of exercise involved plus a lot of exposure.

DR. DUKES-DUBOS: But there is no experimental evidence of how much this phenomenon would change. It may be that the person's perspiration is increased and he may be able to maintain thermoregulation. Yet, it may also be that if this heat is added by microwave into the deep tissues, such a maintenance of deep-body temperature will not occur because immediately the body temperature will increase. That is a very important consideration because it would nullify the concept which assumes that up to a certain level, man is able to maintain equilibrium.

MR. JANES: It would be a very interesting calculation to take the data presented today concerning the zones in terms of units that are convertible to watts per kilogram, and substitute that as a radiofrequency or radio wave load and see what is computed in terms of watts per kilogram for zones. Then one might ask the question of whether that is analogous to an environmental heat load or to a deep tissue load, and where it stands with respect to standards.

DR. STOLWIJK: The loads we were showing you by comparison, are enormous. They are many hundreds of watts.

MR. JANES: But roughly, in watts per kilogram?

DR. STOLWIJK: Five watts per kilogram, concentrated in the muscle mass first and then distributed over to the rest of the body.

MR. JANES: Is it prescriptive zone?

DR. STOLWIJK: Yes.

DR. DUKES-DOBOS: This is because the basic metabolism is raised as much as 3 to 5 times.

DR. DASSLER: In the case of your pole climbers, or the outside worker, be very careful with the laboratory data because one may forget the thermal radiation effect that exists outdoors. This can be rather extensive in an industrial setting as well. It has to be included, and indoors in a blast furnace type situation, it could be a very serious thing.

MR. JANES: I don't think this discussion should be ended with the workshop.

DR. ATHEY: I think you are right. This dialogue between the disciplines should continue.

(The meeting was concluded)

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