"One of the paradoxes of all time is that nuclear radiation is likely to be our salvation. Radioactive tracers may be what it takes to increase our understanding of the emotions of fear, violence, and destructiveness to the point that we can diminish the dangers of nuclear war. PET (positron emission tomography) studies of the human brain can help us understand better the chemistry of fear, aggression, and violence, so that we can direct our energies in a safe and constructive direction toward further human progress rather than a nuclear holocaust. The solution to the dangers of the atomic nucleus may lie in the exploration of the chemistry of human emotions, the chemistry of fear, paranoia, and aggression."

Nuclear medicine now offers the opportunity to enhance preventive measures, diagnosis, and/or treatment of mental disorders, epilepsy, brain tumors, stroke, Parkinson's disease, Alzheimer's disease, and other neurological diseases and disorders.

PET scans use the positron emitting radionuclides carbon-11, fluorine-18, and oxygen-15 *in vivo* to build up sections of the organ into a three-dimensional image. PET and SPECT (single photon emission computed tomography) reveal images of regional chemistry and disease. Half of the papers of the SNM's meeting, where about 1000 oral presentations were made, involved PET or SPECT, with the brain being the dominant subject. The current focus is upon the mechanisms of intercellular communication. A number of papers were on receptors, a chemical binding that occurs between drugs and specific chemical groups on cell surfaces. Chemical neuro-transmitters such as dopamine and norepinephrine can be varied in concentration by certain drugs. For example, drugs are effective in treating schizophrenia by blocking the binding of dopamine in the brain's receptors or in treating Parkinson's disease by administering L-dopa to increase the concentration of a neurotransmitter in the brain.

Today nuclear medicine is advancing beyond that point and a number of papers were given at the SNM Meeting on iodine-123 receptor ligands. The longer half-life of iodine-123 allows for longer studies than are possible with carbon-11 or fluorine-18. Thus, other receptors can be examined as well. Another mystery of the brain is the role of receptors in the process of neurotransmission because of the lack of knowledge on their synthesis and metabolism. However, measurement of the neuronal energy supply and the synthesis of neurotransmitters are now possible in human beings. A number of papers concerned the use of technetium-99m in connection with isonitriles and antibodies that serve to advance nuclear medicine with greater SPECT scanning and resolution.

Professor Wagner remarked that the road to nuclear medicine has two lanes: PET and SPECT. The revelation of regional chemistry images in the brain holds great promise for the future. Turning to other subjects, he estimated that one out of three hospital admissions in the United States involved nuclear medicine procedures and that such are growing rapidly in Japan and Europe. When asked how to create a better environment for nuclear medicine, he thought that expediting federal approvals of nuclear medicine procedures, dealing rationally and economically with low level wastes, and educating the public on the risks and benefits of radiation and radioisotopes would be most helpful.