(with decrease in the relative volume of the serum) is very common or perhaps constant towards the end. Frequently the change is extreme. The erythrocyte count and hemoglobin percentage are increased. The conductivity of the blood is diminished. That of the serum was either unchanged or somewhat diminished. This agrees with our result for the chlorine which also remained constant, or sometimes seemed to be moderately lessened. The non-protein and urea nitrogen were markedly increased in the terminal stages. In some cases the increase began definitely before the characteristic symptoms had appeared. (In this connection it may be mentioned that in a case of typical Addison's disease recently studied by one of us (J. M. R.) a high NPN and urea were seen). The amounts of uric acid, creatin, creatinin and amino-acid nitrogen were not materially altered. The undetermined fraction of the NPN sometimes appeared to undergo a significant increase. In some of the cases the serum calcium appeared to be increased. It is only towards the end, when the symptoms have become well established, that any striking diminution in the dextrose takes place. An interesting point is that in a pregnant dog, which remains in good health fifty-five days after removal of the second adrenal, no changes in the blood were observed till three days before death, which occurred on the fifty-ninth day.

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A PRINCIPLE OF CORRESPONDENCE

MERCURY vapor has been bombarded by electrons of homogeneous velocities (produced by magnetic analysis), revealing interesting information on the nature of the probability that an electron will ionize an atom. It has been found that the minimum ionization potential is 10.4 volts, while other critical potentials exist at approximately 10.6, 11.2, 11.6 and 11.9 volts, respectively. Presumably others of higher energies will be noted when the experiments are extended. Further, it has been observed that the probability of ionization is finite when the electron has just enough energy to ionize the mercury atom (10.4 volts) and that this probability decreases with increasing electron energies to the next critical potential, where it takes on a sharp rise to a higher value, decreasing again to the third critical potential, et cetera. The sudden increases of the probability of ionization are attributed to the setting in of various distinct types of atomic energy transitions involving ionization, each type of transition having a maximum probability of excitation for electron energies of the minimum amount able to carry through the process. Thus, the probability of ionization by electron impact resembles in form the radiation quantum absorption probabilities observed in the X-ray region. However, a point of much vital interest is that the probability as a function of the energy is more closely of the form found by Foote, Mohler and Chenault for the probability of ionization of Caesium vapor by light quanta. This fact has suggested the following hypothesis of correspondence in the behavior of electrons and light quanta in atomic processes involving ionization:

Electrons and radiation quanta obey the same general laws, expressed as functions of their energy, concerned with ionization of atoms. In particular, the probability that an electron will produce a given type of ionization expressed as a function of its energy is of the same form as the corresponding probability function for radiation quanta.

This postulate correlates a range of experimental facts that heretofore have been unintelligible. For example, Foote, Mohler and Chenault found a maximum ionization probability in Caesium vapor for light quanta of minimum energy (series limit frequency), which decreased rapidly for light quanta of higher energies, though well below the series limit an anomalously large probability was observed. On the other hand, the writer found that the ionization in potassium vapor increased above the threshold frequency. On the present hypothesis the two sets of experiments are consistent with each other, and the experiments of K. T. Compton and Van Voorhis, Hughes and Klein, and others on the probabilities of ionization by electron impact. Further, it is interesting to point out that the correspondence here suggested is in harmony with the Compton effect. It has been known for a long time that ionization by electrons of large energies (beta rays) may be accounted for along classical lines, *i.e.*, conservation of energy and momentum. The principle here suggested implies, therefore, that there is a type of ionization by radiation quanta of large energy wherein the laws of conservation of energy and momentum are explicitly obeyed. The Compton effect bears out this implication. Using Bohr's theory of ionization by beta rays in conjunction with the above postulate the probability of a quantum ionizing according to the Compton effect may be evaluated and is found to agree well with experimental facts. It is needless to emphasize the utility of the principle in determining ionization probabilities in unknown regions of the radiation spectrum, and finally, it contributes one more condition in statistical theories concerned with the interaction of radiation and matter.

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