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## FUNCTIONS OF A TOXICOLOGIST

W. J. R. Camp

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The concept of this article is in no manner expected to be definitive, rather hopefully provocative, since the writer fully realizes that conditions in areas other than the one he has to draw upon may, and in all probability will, alter the premises considered here. But with suggestions from others it can be expected that this Academy will with circumspection generally establish the functions of the toxicologist.

If one starts with the definition of toxicology given by the late Walter Haines that "toxicology is the science that treats of poisons, their origin, properties, and action on the system, and the treatment of their noxious effects, and their detection by chemical or other means," one will have to conclude that the toxicologist must be an individual of many facets. It is this writer's belief that it is really expecting too much of anyone to be a specialist in all the fields implied in the above definition, and others undoubtedly hold a similar view for it is becoming clear that toxicology is becoming a cooperative science, groups of individuals working together, each one specializing in one of the particular areas of toxicology, but cognizant at least to some degree of the entire field.

Of course the final disposition of any findings rests with one individual. But a most rational disposition can be had after generous consultation with the staff. It must be borne in mind that the one who signs the final report is responsible for the statements it contains and he should not include any material that he is not willing to support wholeheartedly. He must by necessity be the final judge of reports given to him by his staff. But after having accepted these reports and having sanctioned them he does not have the right to censor his colleagues should the material be ultimately shown to be erroneous. Thus, by implication a toxicologist's first function is to develop a trustworthy and competent staff.

Perhaps it is trite to state that the second function is that of confidence, but instances are well known where this has not been adhered to. Material and information received by a toxicologist is strictly a matter of confidence between the submitting agent and the toxicologist. It should be so treated unless there is evidence that poisoning may be or is being attempted, and then the submitting agent should be informed that the proper legal authorities be notified, and the toxicologist, having

such knowledge, should see to it that the proper authorities are informed. In any event, the findings of a toxicologist should not be made public by him. If after submitting his report to the proper agent, that agent wishes to publicize the findings, that is no responsibility of the toxicologist. Nor should he be disturbed by the too commonly garbled version which appears in the public press.

A third function is that of aide, advisor, and consultant to the pathologist. This is not appreciated by many individuals doing postmortems. Too often a toxicologist never hears from the pathologist until after a report is sent out, and then the most frequent question asked is, "But doctor, what am I going to say the cause of death was?" It is perfectly true that we do meet with pathologists who are willing to give as much history as is available and to tell of the postmortem findings and ask what should be done and what organs should be submitted. But all too many specimens are submitted without any history or findings. And so often the wrong organs are submitted. Let this writer cite an example. Recently he received a jar containing one kidney, a bottle with about 60 cc. of blood, and a small bottle with about 1 cc. of bloody urine. The information was given that the blood in the urine was from the syringe, and that the kidney alone was sent because it was handy and the pathologist was in a hurry. He was sure that the individual died of secobarbital poisoning. No one has ever been killed by secobarbital found in the kidney, liver, or any other organ. It is only that found in the brain that is of significance. At the best, the presence of depressants in organs other than the brain is presumptive evidence that the depressant has been ingested, that it has been absorbed, and that the probability exists that some will be found in the brain since it is present in other organs. From a study of a number of cases, we have come to the conclusion that it is impossible to extrapolate the amount found in the brain from the amount found in other organs. We have been able to convince a number of pathologists that we should be consulted about samples to be submitted, but, although the progress is definite, it is slow.

Should the pathologist wish to consult with the toxicologist as to the final disposition of a case, the latter should give his services freely and wholeheartedly. Many a puzzling case may and can be straightened out by a frank discussion of all the findings and perhaps with rare exceptions, the toxicologist should not expect the pathologist to be extremely conversant with toxicology. He should offer such information as is available and thoroughly consider the case on the basis of the history, the pathology, and the laboratory findings. The toxicologist should have his say, but he should not insist on his viewpoint being

accepted since it is the pathologist who makes the final disposition. The toxicologist does not sign death certificates.

A fourth function is similar to the third but involves the practicing physician. It has been this writer's experience that the average practitioner is woefully ignorant of the processes of poisoning, and it appears that much of his information has been culled from reading detective novels rather than from reliable sources. Undoubtedly, many toxicologists have had the impossible expected of them by some physician. For example, a specimen of 15 short pieces of hair was submitted to the writer to determine if the patient was suffering from arsenic poisoning. Twenty-four-hour samples of urine have been submitted for lead analysis in soft glass bottles with a piece of paper towel for a cork. Invariably the gastric contents from patients supposed to have taken lye received from a large charitable hospital are acid in character, the sample being recovered after dilute acetic acid has been administered. Many other such examples could be added but to no profit. Suffice it to say that all these cases are refused. The point which is to be made is that toxicologist has the function of informing and educating the practitioner concerning proper procedures to follow in cases involving poisoning. It might be added as an aside that we do have physicians, particularly lazy or inept internes, who wish the toxicologist to make the diagnosis for them. This is not a function of the toxicologist.

A fifth function involves lawyers who are handling what they consider poison cases. And as we have various kinds of pathologists and physicians, so we have a variety of lawyers. Some are intent on putting words into the mouth of the toxicologist; while others are interested in seeking his advice. The latter are interesting to work with; while the former should be given small consideration. A toxicologist should demand full acquaintance with a case before he agrees to take it, but whether he accepts the case or refuses it, all this information, needless to say, should be held in strictest confidence.

The fifth function dovetails with the sixth, that of expert witness. It can be hoped that the time will come when expert witnesses are actually friends of the court and not supporters of one or the other side of a lawsuit. But conditions are not such, and the toxicologist is expected to bolster one side or the other. It is of paramount importance that the toxicologist honestly believes the testimony he gives and that he bases it on knowledge which to the best of his thinking he considers to be true. It is unthinkable for an expert witness to reverse his testimony and still keep face. Nor should he permit himself to be drawn into phases of the suit concerning which he has no business, to

express an opinion. A toxicologist is accepted as an expert in his field, and he should keep in his field regardless of what other opinions he might have and how much pressure is put on him to extend his viewpoints about the case other than those of toxicology.

The seventh function is that of public relations. This writer does not mean that the toxicologist should concern himself with the analysis of sugar, tea, coffee, etc. which individuals continuously submit on the suspicion that poisoning is being attempted. These cases should be referred to the proper authorities for disposition. Rather the toxicologist should cooperate with governmental agencies to decrease general over-the-counter sale of poisonous substances. It is within the scope of such societies as this to propose or support adequate legislation for the protection of the public. It is better that that legislation comes from reliable sources than from some impracticable politico. Popular articles written by members of such a society as this might do much to inform the public of the dangers of indiscriminate use of potentially poisonous substances.

An eighth function is that of disseminating knowledge and the doing of research in the various areas of toxicology, treatment, analysis, etc. to mention a few. Since progress can be made only by reconsidering accepted facts and attempting to find new ones, this function is of utmost importance. Its value is so obvious the writer shall not say more about it, except that it is difficult to have lay individuals and even some scientists understand its time-consuming requirements.

A ninth and final function is that of training men in the field of toxicology. It is not a subject to be learned over-night, and adequate training can be had only in those centers doing toxicological work. It is astounding the number of states that do not have toxicology service, and one reason may be the scarcity of competent toxicologists.

Undoubtedly other functions of a toxicologist have been omitted, but these which have been covered apply most generally. It is well to consider that we as toxicologists do have responsibilities other than simply analyses of specimens.