January 13, 1938

Re: Case of [redacted]

Continental Casualty Company
Chicago, Illinois

Attention: Mr. C. W. Sagehorn

Dear Sir:-

After some discussion of various aspects of the case of [redacted] deceased, it is apparent that there are certain types of information necessary in order to arrive at a conclusion as to the background of the illness and death of this man.

First, with reference to the possibility of exposure of the deceased to certain toxic substances. It is well known that when carbon tetrachloride is thrown into a fire or exposed to high temperatures through contact with heated surfaces of metal, or other non-combustible materials, that there is a fairly rapid decomposition of this material whereby variable quantities of hydrochloric acid are produced. Under certain conditions phosgene, a very toxic gas, is produced also in variable amount. The quantities of these different materials produced in unit time vary with the temperature, with the surface area of the heated material, with the nature of the fire (that is, whether it is free burning or whether it is burning in the presence of inadequate oxygen ), and with the quantity of carbon tetrachloride available. Obviously also the concentration of these materials which can be found in the atmosphere of an enclosed space will depend upon the volume of that enclosed space. In this instance a flameless fire is reputed to have continued for from twenty to twenty-five minutes. In order to determine the degree of hazard of persons who may have been in contact with this fire, one should know the approximate quantity of the carbontetrachloride used, the approximate duration of the fire, as much as possible about the temperatures produced, and the extent of the heated surface exposed to carbon tetrachloride. One should also know the size of the room and whether or not any ventilation was present, or whether it was necessary to open doors and windows to allow the escape of irritating fumes either during or after the fire. It may be that it will not be possible to determine all of these facts, but as complete detailed knowledge as is possible should be obtained. With reference to the presence of significant quantities of irritating fumes in the room, it should be possible to obtain adequate information from any other presons who may have been in the room at the time

of the fire, or who may have given assistance in extinguishing the fire. If these men did not notice highly irritating vapors and if they had no difficulty subsequently, one can rest assured that the quantities of either carbon tetrachloride, hydrochloric acid or phosgene were substantially insignificant.

Second, the nature of Mr. [redacted] illness should be determined as accurately as possible by a careful examination of the complete record of the hospital and every item of recorded information should be examined carefully in order to determine whether or not his illness was of any characteristic type. The presumption from the meager details supplied to me was that this was an acute infectious type of nephritis to which every other symptom and sign of illness was secondary. If this was the case, the observations made in the hospital, if adequately reported and recorded, should show clearly. There are two questions involved here. Was the man's illness characteristic of carbon tetrachloride intoxication, hydrochloric acid intoxication, or phosgene poisoning, or a combination of these three? Or was his illness entirely different from what would be expected in the above picture and was it characteristic of some other wellknown disease process?

If the available medical data are inadequate to answer these questions, every effort must be made to obtain other medical data and as a last resort, it may be necessary to have a necropsy performed so as to determine the precise nature of the illness, and if possible, the cause of death. It must be recognized that the necropsy may not give entirely satisfactory evidence. On the other hand it is very likely to do so and if suitable information is not otherwise available, this would seem to be the only additional procedure that could provide the missing information. Incidentally if assistance and advice in the matter of a necropsy is required, Dr. Ernest Goodpasture at Vanderbilt University should be able either to provide the service or to advise as to who might best perform this work.

The impression of the writer from the information given is that there was no cause of injury or of death associated with the exposure to the fire. It seems quite probable that the man died of an acute infectious nephritis. This opinion is supported by the apparent course of the illness as meagerly reported, and by the presence of pus, blood and bacteria in the urine during the entire course of the illness. This would be further substantiated if the hospital record showed that the temperature curve and the general clinical progress of this case was that of an acute infectious nephritis. Carbon tetrachloride, on the other hand, would be expected to produce acute initial symptoms with central nervous system depression

and later irritation, associated with nausea, vomiting and perhaps such liver disturbance as jaundice. This process should be without fever and without evidence of pus in the urine. Exposure to fumes of hydrochloric acid would without exception produce an acute irritation of the upper respiratory tract and of the lungs. Under average conditions of endurable exposure to hydrochloric acid, this condition should be at its worst during the first twenty-four hours and should subsequently subside without great difficult unless an acute pulmonary edema were to develop. In any case there might be some degree of bronchitis following a few days after the exposure. However if death were to occur from this cause, it would certainly be because of a pulmonary edema which would develop not later than forty-eight hours after the exposure. Exposure to phosgene might produce very little in the way of initial symptoms. In fatal cases phosgene poisoning of even in cases of serious injury from phosgene, it could confidently be expected that some pulmonary edema would develop within the first seventy-two hours. Its failure to do so at this time would prove that it was not an important factor in the disease process. Thus in the case of carbon tetrachloride, one would expect to find the symptoms referred chiefly to the central nervous system and to the liver, whereas in hydrochloric acid and phosgene poisoning the symptoms would be primarily in the lungs. The combination of these exposures would, therefore, produce primary injury to the lungs, the central nervous system and the liver as distinguished from primary evidence of disease of the kidneys. With these items in mind, it should be possible to make a differential diagnosis from the clinical data, if such data have been properly recorded.

This covers the situation as adequately as I am able to do it from the available information.

Very truly yours,

RAK:is

Robert A. Kehoe, M.D.