Summary and Conclusion
Exposure to organophosphorus insecticide, dimecron, the development of chick embryo hampers a lot, and presents some characteristic features which have been studied and discussed. It is known that embryo possesses some regulative property against all possible hazards. The present study shows that chick embryos tolerate certain dose level. Higher than this level is irresistible and though it survives few days, ultimately die. For the specific two doses, the mortality rate is increased with the higher dose as well as increased exposure time. With this, the percentage of abnormal embryos gradually decreases with increasing time of exposure, suggesting a lethal condition of the abnormal embryos. This can be verified with the findings that when the mortality rate in the treated embryos is very high in comparison to controls in 14th day of incubation, the difference in the rate of abnormalities comes down. The lethality thus occurs due to the exposure of insecticide might be correlated with the loss of neuromuscular control and inhibition of cholinesterase activity. Failure to maintain sequential changes in the body is another possibility of lethality.

On the other hand, the treated whole embryo shows loss of water from its body. This suggests that insecticide causes water loss from fresh mass resulting embryonic dehydration and possibly in low hatching rate. The water loss from the cells and the intercellular space might be the reason of reduction in the gross weight of whole body as well as from the vital organs or parts e.g., liver, kidney, brain and spinal cord. But the rate of decrease diminishes with the time, in the present case, indicating biodegradation of the insecticide. As growth of the body inhibits, it simultaneously affects the length of the neck and trunk of the whole body. So far as teratogenecity is concerned, in the present study, the treated embryos show certain abnormal features like absence of one eye, abnormality in the formation of beak as well as exposition of internal organs. If the embryos are examined critically, some abnormalities in the formation of skeleton are also noticed. This suggests that the usual process of differentiation in the formation of organs and other structures as seen in normal embryos does not take place in the insecticide exposed embryos. The somatic indices in brain, liver and kidney in these embryos show a variable pattern.
It is known that a chain of reaction takes place in morphogenetic processes and each step of morphogenesis is controlled and determined by some biochemical triggering. Thus a quantitative and qualitative study of both proteins and RNA in the organs of brain, liver and kidney have been made in the present study. It is observed that the quantity and the nature of proteins in treated embryos have a marked difference from those of the control embryos. The variability is maximum in embryos treated with higher dose, when the vital organs are about to start its formation. Thus the organs which show apparently normal features, are actually deficient in its physiological functioning due to the exposure of insecticide. Similarly, the quantity and the nature of RNA in treated embryos also differ from the control embryos. So a change takes place in the structure which may not work in the normal way. This is further confirmed through histopathological study of the organs. Loss of amniotic fluid protein in treated embryos in the present study is being considered as a set back in the morphogenetic processes. To minimize the stress condition the treated embryos also utilise cholesterol for the synthesis of steroidal hormones.

It may be further noted that the activity of enzymes, in terms of both acid and alkaline phosphatases, increases in both the liver and the kidney. Cytotoxic action of the pesticide and to combat the stress resulting from the pesticide exposure made this possible to activate the enzymes.

With this biochemical inconsistency, 4-day whole embryo is considered for histopathological examination. It is observed that the whole embryo shows abnormalities in the formation and development of the brain, spinal cord, notochord and the eye as well as the heart, when exposed to insecticide. This suggests that normal differentiation processes leading to the formation of these vital structures do not take place. Instead some abnormalities developed which might lead to inappropriate function of these structures. Further, on examination of some vital organs e.g., liver and kidney, on specific days of development, it is noticed that cellular structures mostly are degenerated in treated embryos. The rate of
degeneration or loss of cellular integrity is more in embryos treated with higher dose, indicating a dose related effect and finally, an irregularity in their function.

Considering all these facts, it may be stated that though the embryo looks like almost morphologically normal one, is not so. A small but physiologically significant change is suspected for specific organ. In the present case, changes are assessed in whole embryo and different organs of embryo at specific days of development, through morphological, biochemical and histological study and correlations are made with functional activity. Hence, it may be concluded that dimecron has an embryo-toxic effect and shows dose dependent alterations in the development of chick embryos.