TABLE III

Composition of gas samples obtained from different waste-materials

SOURCE	No. of trials	COMPOSITION %				
		Co_2	O_2	CO	CH_4	Other Gases
Cow-dung	3	35·8	6·0	0·9	50·1	7·2
Buffalo-dung	3	35·0	6·2	1·0	49·8	8·0
Horse-dung	3	29·6	6·8	1·4	55·2	7·0
Sheep-droppings	3	28·2	6·2	0·8	54·0	10·8
Camel-dung	3	30·0	6·0	0·9	53·0	10·1
Goat-droppings	3	22·8	8·6	0·8	53·2	14·6
Piggery-Waste	3	26·5	7·2	1·8	56·0	8·5
Poultry-droppings	3	25·4	8·5	1·2	56·0	8·9

represented at Table II has been found in accordance with their gas-production behaviour as represented at Fig. 1. Factors like low temperature and scum formation have been found to retard the gas production. Stirring during the experiment was found to accelerate gas production considerably.

The samples of gas obtained from the above waste-materials were analysed employing Orsat Gas Analyser. The comparative composition is represented at Table III.

The gas obtained from the piggery and poultry droppings have been found richer in methane content as compared to the gas obtained from cow/buffalo dung.

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National Dairy Research Institute,
Aarey Milk Colony,
Bombay 400 065, *October* 3, 1975.

U. P. SHARMA.
T. M. PAUL.

A STUDY OF THE EFFECTS OF DDVP (PROPOXURE) ON LABORATORY MOUSE

HARMFUL effects of insecticides on animals including mammals have been studied by several investigators[1-3]. Some insecticides are less potent, and induce overall deleterious effects on biological systems but not mortality. Studies on the effects of these agents on the reproductive system would be of significance to understand the expression of these effects.

DDVP is one of the potent insecticides which does not inflict drastic effects like mutations on mammalian systems. Keeping this in mind, during 1969, for the first time, it was used in the premises of the mice colony of Cancer Research Institute. Though the use of the insecticide was restricted to the area where cages were cleaned and exchanged, it was noticed that a large number of mice in the colony failed to have the expected number of litters. The present study was initiated to ascertain whether DDVP treatment of the mouse cages had contributed to this effect.

Materials and Methods:

Eight to twelve-week old mice of C 57 bl and Swiss/Icrc strains (three females and one male) were placed in each cage with controlled temperature and humidity. When the females were visibly pregnant, they were transferred to DDVP sprayed cages.

The treatment of cages consisted of weekly spraying of DDVP (approximately 2·1–2·4 gm/cage) into each cage. When the females delivered, the treatment was discontinued for two weeks. Spraying of the mothers (F generation) and the weanlings (F_1) was continued after the young were weaned. The treatment was stopped after 10 months in the case of F generation and 8 months in the case of F_1. Fertility of these two groups of mice was assessed on the basis of number of litters delivered by the females.

All animals were maintained until death. Animals which were observed weak or sick were sacrificed, their ovaries or testes dissected for histological study.

Observations :

In the direct treatment group, the first observable effect following three months treatment was ruffled hair, breathing difficulties, diarrhoea and general weakness. The long term effects were premature death or in those that survived, partial sterility (as low as a single litter) or complete sterility (Table I).

TABLE I

Animals studied	Total No. of Animals	Longevity upto 14 Months	Longevity upto 15 Months and more	Mortality before maturity: Young	Mortality before maturity: Dead
C57 Control	45	8 (17·7%)	37 (82·2%)	..	..
C57 Treated F	35	20 (60%)	15 (40%)	..	..
F_1	36	24 (66·66%)	12 (33·33%)	110	(68%)
Swiss Control	40	6 (15%)	34 (85%)	..	..
Swiss Treated F	43	16 (37·29%)	27 (62·79%)		
F_1	126	37 (29·37%)	89 (70 63%)	144	(67·3%)

TABLE II

Animals studied	Total No. of breeders	No. of Animals bred	Total litters	Av. No. of litters	Total No. of young born	Litter size	Sterile animals
C57 Control	25	25 (100%)	151	6·00	1123	7·4	..
C57 Treated F	20	19	23	1·2	161	8·4	
F_1	21	2	2	0·100	11	5·5	19 (90 5%)
Swiss Control	20	20	122	6·1	770	6·3	..
Swis Treated F	24	23	42	1·75	270	6·4	73
F_1	61	24	43	1·8	277	6·4	(60·5%)

Normal litters born, were kept for mating continuously from puberty 'till old age. Even then the treated mice remained partly sterile and the most affected strain was C 57 (Table II). Sterility in the F_1 generation was very high and the average number of litters was significantly low as a result of DDVP spray (Table II).

Histology :

Histology of the testes of the treated males revealed the presence of large vacuoles in them as a result of the deletion of seminiferous tubules. Germ cells were lacking in many tubules and cryptorchism was a common feature of these animals. Testes tumours were seen in two of the treated animals. Ovaries of treated females were hyalinized in nature and the follicles and oocytes were absent in a large number of animals.

Discussion :

The deleterious effects of insectides on breeding performance of various animals have been observed by several workers[4-8]. According to Hodjat (1971)[7] shorter exposure to DDT at 6·20 mg/litre caused reduced egg production and fertility in *Dysdercus fasciatus*. Lineva (1962)[9] claimed that sublethal exposure to insecticide induced abnormalities in the oogenesis of house fly. In the present experiment, animals had only environmental contact with DDVP. However, it is significant that a large number of treated C 57 animals were sterile (Table II). The histological data of the testes and ovaries of treated animals explain the pathogenicity of this insecticide. The fall in the longevity of the pesticide exposed animals (Table I) might be due to the general toxicity of the chemical[10]. The data presented in this paper indicate that DDVP spray causes sterility in mouse by bringing about drastic abnormalities in the reproductive systems.

Entomology Division, A. V. D'SOUZA.
Cancer Research Institute, B. K. BATRA.
Tata Memorial Centre,
Parel, Bombay 400 012,
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CORONA STRUCTURES AND THE ORIGIN OF HORNBLENDE-BEARING ROCKS OF S. WAYANAD, KERALA STATE

IN S. Wayanad (Calicut Dist.) hornblende-bearing gneisses containing amphibolite and minor schistose bands constitute the major rock types in contrast to charnockites in south and central Kerala. However, these hornblende-bearing rocks carry frequently, as in south and central Kerala, pyroxene granulites as thin disconnected patches and lenticular boudins, rarely extending beyond a few meters along the strike. The gneisses, often banded and occasionally streaky, and schists have developed a megascopic axial surface foliation, mainly after hornblende and biotite. The granulites though free from megascopic foliation were also involved in the deformation and metamorphism responsible for the production of the axial surface foliation[1].

Hornblende, developed on a large scale in the rocks of the present area containing hornblende-free pyroxene granulites, can be either a granulite facies prograde[2] or an amphibolite facies retrograde product, or both.

Features characteristic of granulite facies hornblende[3] such as greenish brown colour, presence of opaque granules along hornblende grain boundaries[2] and pyroxene coronas around hornblende and alteration of hornblende into pyroxenes are not seen. Since sufficient quartz is present, failure of hornblende break-down reactions cannot be ascribed to lack of quartz. Hence hornblende is not likely to be a prograde product.

On the other hand, some of the pyroxene granulite patches in the gneisses around Chundale (11° 34′ 30″: 76° 3′ 30″) show coronas of secondary hornblende around pyroxenes (Fig. 1). Synentatic rims are

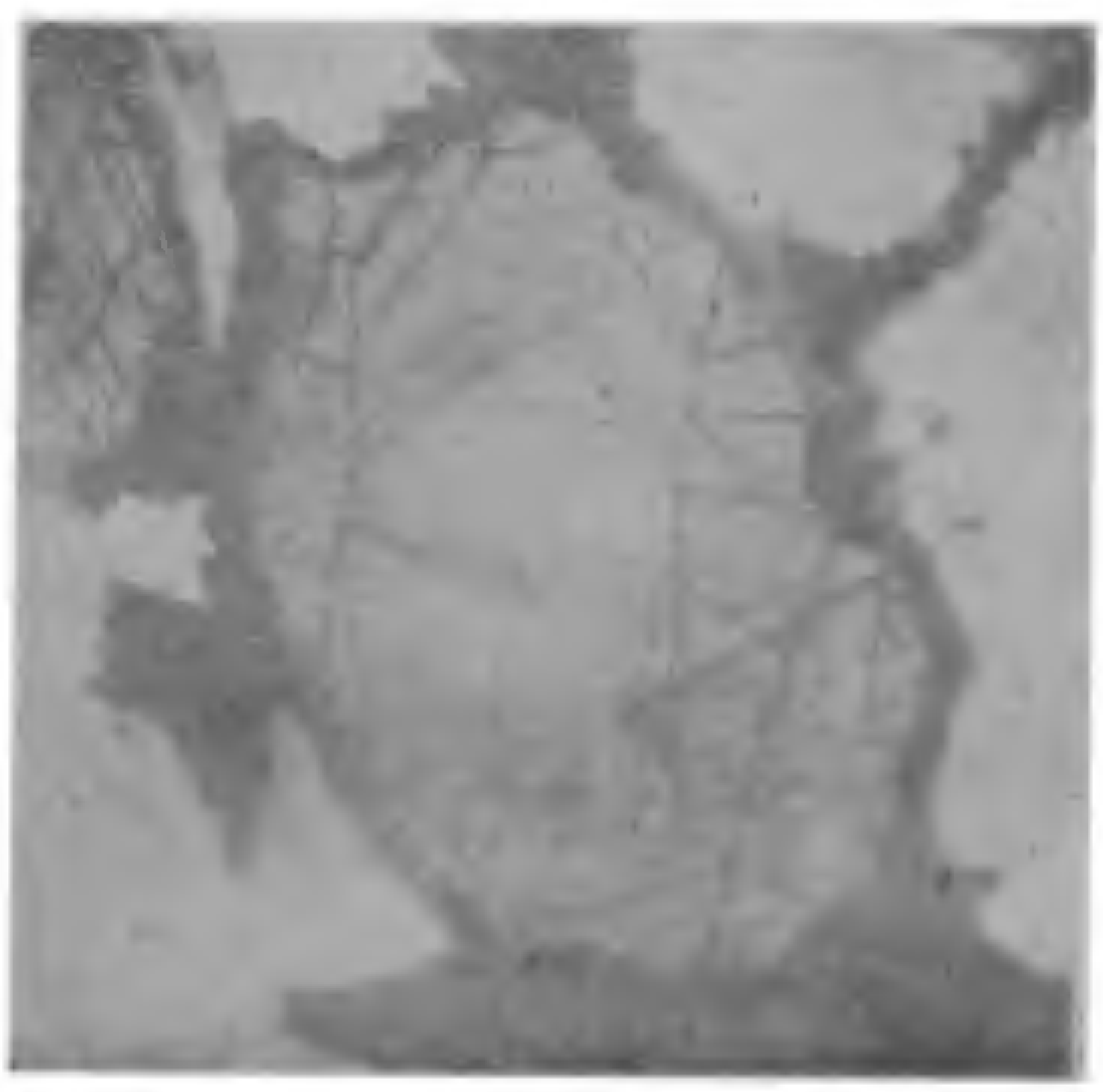

FIG. 1. Clino-pyroxene with corona. Lighter parts of the structure formed of intergrowth of hornblende and quartz and the darker parts of opaque ores. Plane polarised light, × 40.

seen around both ortho- and clino-pyroxenes. The formation and width of the rims are independent of the nature and grain size of the pyroxenes. As a rule, the corona rims are formed when pyroxene is in contact with plagioclase. However, such rims, though incomplete, are also seen along the contact of adjacent pyroxene grains, especially in the vicinity of plagioclase. The corona rim consists of a fine symplectite