Mostler[1] and by Stefanov[2] from the Upper Anisian of Austria and Bulgaria respectively.

In the present microfauna, holothuroids occur in association with conodonts, microvertebrates, ostracodes, foraminifera, micromolluscs and echinoid spines. The conodont fauna is referable to Middle Triassic *Gladigondolella tethydis* assemblage[3] and includes the following forms besides *G. tethydis* : *Neogondolella mombergensis, N. constricta, N. huckriedei, Paragondolella excelsa* and *P. navicula navicula*.

First fossil holothuroids from India were discovered by Gowda[4] from the Cretaceous of Trichinopoly, Tamil Nadu. Since then there has been active interest among Indian workers and fossil holothuroids have been described or repor ed from Jurassic and Cretaceous sediments and also from the Tertiary and Quaternary sediments but these fossils are almost unknown from the Himalayan Triassic. In India, so far sclerites have not been found useful in biostratigraphic work. However, Kozur and Mostler[5] have shown some biostratigraphic utility of holothurian sclerites in the Anisian of Germany. The present report of sclerites from Malla Johar is significant as these fossils are very rare in the Triassic of Himalaya. This report not only extends our knowledge of holothuroids from the Indian Triassic but also extends the geographic range of species of *Acanthothellia anisica* into Kumaun Himalaya. Further active studies on holothuroids in Triassic may be useful in biostratigraphy.

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MITOTIC SPINDLE IRREGULARITIES INDUCED BY ASPIRIN IN *ALLIUM CEPA*

ASPIRIN (acetyl salicylic acid) is well known as an antipyretic and analgesic agent and is mostly used either as such or in combination with other stimulants like caffeine. The mutagenic action of aspirin has been assessed by various workers in plants and animals[1–4]. In the present report an attempt is made to establish the mitotic spindle-inhibiting action of aspirin in root meristematic cells of *Allium cepa*.

Aspirin of required concentrations were prepared using distilled water. Fast growing roots of *Allium cepa* were treated with 0·01%, 0·02%, 0·05% and 0·10% at room temperature for 3 hours. Bulbs grown in distilled water served as control. Treated and control roots were fixed in 1 : 3 Carnoy's fluid for 24 hours and preserved in 70% alcohol. The root tips were examined by the usual squash method[5] for cytological observation. Metaphase and anaphase figures were analysed in most cases, since spindle irregularities are most readily detected at these stages. The observations were recorded on 500 cells from different root tips of each concentration.

The data presented in Table I shows that the mitotic index is lower in treated roots compared tothe control and there are differences in mitotic index among the four concentrations. Scattering of chromosomes at metaphase and anaphase (Figs. 2–5) and irregular formation of cell plate at ana-telophase (Figs. 8–9) comprised the most dominant types of anomalies. Lagging of chromosomes (Fig. 6), unequal distribution of chromosomes (Fig. 10), tripolar anaphases (Fig. 11) and formation of binucleate cells (Fig. 12) were less frequently observed. It is constantly observed that higher the concentration of aspirin greater is the effect (Table I).

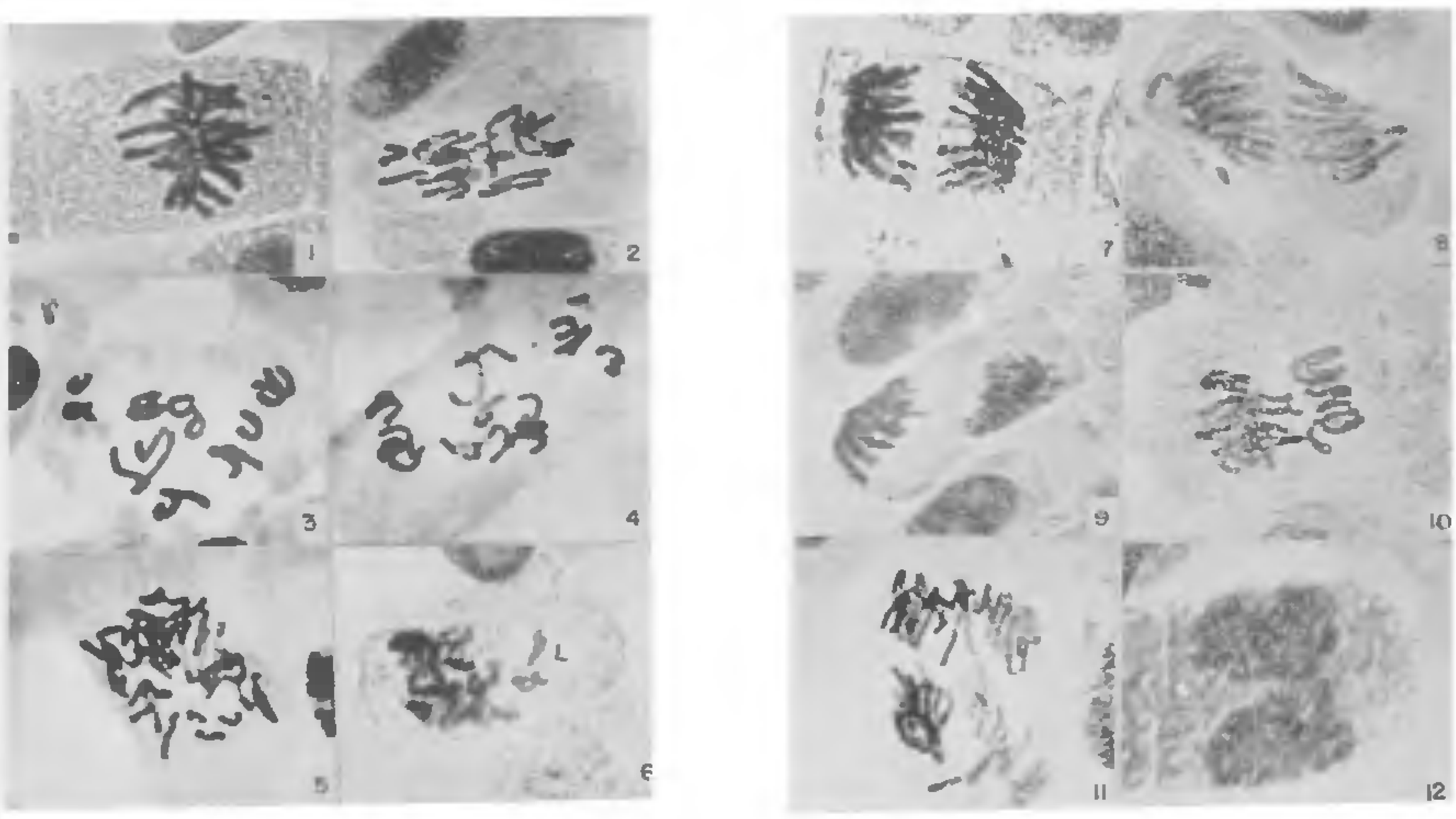
The morphological changes of the chromosomes include contraction and different stages of condensation of chromosomes, chromosome breakage, stickiness and clumping of chromosomes and erosion of chromatin material. The morphological changes observed in the present study agree with the results of previous workers[1–4].

The mitotic inhibiting action of aspirin include, stopping of the entering of cells into division, inhibitory action on spindle apparatus and prevention of cell wall development at telophase. After treatment with aspirin majority of the early prophase cells revert back to the interphase condition. This reveals its action as 'Preprophase inhibitor of mitosis'[6]. Further, aspirin does not inhibit chromosome reproduction and division, reverting its action only in G2 stage of interphase. Based on mutagenic and spindle inhibiting action, aspirin could be assigned to a 'Mitotic poison with radiomimetic action'[7–8].

TABLE I

Mitotic index and various types of spindle irregularities following aspirin treatment

	Percentage of spindle irregularities after treatment (concentration)					
	Control	0·01	0·02	0·05	0·10	Average
Mitotic index	25	22	20	16	12	17·50
Metaphase						
Scattering of chromosomes	1·0	4·8	12·4	23·2	28·2	17·50
Laggards	2·4	3·6	10·2	24·4	29·6	16·95
Disturbed cells	3·2	9·4	20·6	31·8	40·2	25·50
Normal cells	94·4	82·2	56·8	20·6	2·0	40·40
Anaphase						
Uneven distribution	00·0	00·4	02·0	10·4	18·2	7·75
Tripolar anaphase	00·0	00·0	00·0	8·4	16·4	6·20
Disturbed cells	3·8	9·2	21·2	51·2	58·6	35·05
Normal cells	96·2	90·8	76·8	30·0	6·8	51·10
Telophase						
Binucleate cells	00·0	00·0	00·0	2·8	5·0	1·95
Disturbed cells	2·4	7·2	18·4	50·2	62·2	34·50
Normal cells	97·6	92·8	81·6	47·0	32·8	63·55



FIGS. 1–12. Fig. 1. Control metaphase. Figs. 2–5. Scattering of chromosomes at metaphase and anaphases. Fig. 6. Metaphase cell showing laggards. Fig. 7. Control anaphase. Figs. 8–9. Ana-telophases showing diagonal spindle formation. Fig. 10. Cell showing uneven distribution of chromosomes. Fig. 11. A tripolar anaphase. Fig. 12. A binucleate cell.

The spindle anomalies induced by the aspirin are due to disturbances of spindle apparatus. Many types of spindle inhibitors such as mineral and organo-mineral derivatives, organo-aliphatic compounds, aryl organic compounds, alkaloids and some antibiotics are known to induce different types of spindle anoma-

lies in cells of plants and animals[9–10]. Several carbomates such as isopropylphenyl and Rogor are also known to induce such tripolar anaphases in *Allium cepa*[11–12]. Lack of development of cell wall results in the organisation of binucleate cell. Besides antimitotic substances, many cyclic organic compounds, methylated oxypurines and plant extracts are also known to inhibit cell wall formation[13–14]. In general the spindle inhibiting effect of aspirin resembles the spindle-inhibiting action caused by other C-mitotic agents[6–7].

The results and data indicated above reveal that aspirin is potentially capable of producing a variety of spindle anomalies in *Allium cepa*. The above abnormalities indicate that aspirin is potential mitotic poison with radiomimetic action.

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PROGENY TESTS ON APOMICTIC *SORGHUM BICOLOR* (L.) MOENCH.

IN the first report on the occurrence of apomixis in the sorghum line R473, Rao and Narayana[1] concluded that apomixis was entirely due to apospory. They assumed that unreduced embryo sacs were produced from nucellar cells through mitosis. Recently, Murty *et al.*[2] observed that in R473, unreduced embryo sacs may arise not only from apospory but sometimes through direct and indirect diplospory as well. The frequency of each of these phenomena is not known at present. The frequency of apomixis in an organism resulting from aspospory and direct diplospory can be estimated through progeny tests. Originally, progeny tests could not be performed because R473 would not set seed when used as the female. R473 is an F_4 derivative of the cross (Aispuri × IS 2942). Murty *et al.*[2] observed that some seed set could be obtained on R473 when an F_1 (white seed × R473) is used as the male. The parental line white seed is true breeding, its progenitor being a mutant obtained in C. J. Franzke's colchicine treatments. In the present study, it was observed that plants in the F_4 generation of the F_1 of white seed × R473 were also effective in inducing seed set on emasculated spikelets of R473.

The female parent was drawn from the bulk population of R473 maintained by selfing through several generations since 1968. The pollen parent was (WS × R473)–27, supplied by K.F. Schertz of the US Department of Agriculture. Four single plants of R473 were emasculated one day before anthesis and each was dusted with abundant pollen from four individual plants of (WS × R473)-27.

There was varying seed set in the different crosses (10–30%) and the progenies disclosed either hybrids or maternals only or varying proportions of maternal and F_1 plants (Table I). Maternals could be identified from the number of days taken to flowering, compactness of the panicle, awn length and plant height. R473 flowered later, had more compact panicle with shorter awns and was taller in stature than (WS × R473)–27.

TABLE 1

Seed set and frequency of maternals in different hand pollinations on R473 plants

Cross	Seed set (%)	Maternals (%)
1. R473 × 5-65*	20·9	100
2. R473 × 5-67	30·5	0
3. R473 × 5-79	18·5	37
4. R473 × 5 80	10·9	50

* Single plants of (WS × R473)-27.