Man in the remote past whose artifactual evidence forms the material for the present note.

During the exploration on the Campus a total of 90 artifacts were picked up from four localities of which a few selected specimens are shown in Plate 1. The

PLATE 1

surface evidence is stratigraphically confirmed. Basing on the typotechnology of the tools and their stratigraphical position in the section, they can be put to the Lower Palaeolithic Period. The tools are all of Abbevillian type which can be tentatively dated between c. 50,000 and c. 1,00,000 years. The artifacts consist of chopper-chopping tools (23%), hand axes of various forms (37%), cleavers (10%), a scraper (1%) and two discoids (2%). The waste products comprise flakes (11%) and worked pieces (14%) which together constitute one-fourth of the total collection. The chief tool among the finished types is hand axe accounting for over one-third of the total collection. Pebble tools come next in proportion to only hand axes. The tools are all prepared out of the water-worn pebbles of various sizes of medium to coarse-grained quartzite which was available in the (dried-up) bed of river Swarnamukhi. The majority of the artifacts are fresh looking and unrolled indicating that they have not been transported from long distances. The few patinated specimens are dull red to brown in colour.

From a careful observation of the irregular and massive size of the tools and large and deep flake scars, we are inclined to judge that the people were much less versed with the techniques of manufacture than their successors elsewhere in the country. Their inferior technical know-how and large and irregular tool sizes place them in a highly primitive stage of Indian Stone Age sequence. Added to these factors is the big pebbly deposit of great thickness (Plate 2) which was apparently laid not much later than the beginning of the first aggradational phase. All these observations lend support to the view that the owners of those artifacts would probably not be much different physically from the late Australopithecine and early Pithecanthropine counterparts found elsewhere in the Old World. These people must have lived in a relatively wet climatic condition when thick forest growth was present.

PLATE 2

Section facing west at S.V. University Campus.

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EVIDENCE OF CONTACT METAMORPHISM IN THE CHOR AREA, HIMACHAL PRADESH

CHOR HILL located about 100 Km south-east of Simla is known for the occurrence of granite and gneissose granite associated with Jutogh (Precambrian) metamorphites. McMahon[1] considered the granites to have been intruded into its present position and Pilgrim and West[2] have mentioned that it is a large laccolithic intrusion in the Jutogh series constituting the higher parts of the mountain. Although these workers followed by a band of recent investigators have advocated magmatic intrusion, none has recorded the evidence

of contact metamorphism in this region. Pilgrim and West[2] observed the occurrence of xenoliths in the eastern parts of the granite but have not given the textural or mineralogical details of the xenoliths indicating contact metamorphism. Dixit[3] has also reported the occurrence of kyanite-bearing xenolith in the massive granite but the mineral assemblage of his xenoliths does not indicate any facies or subfacies of contact metamorphism. According to Pilgrim and West[2] the older rocks about the granite show essentially metamorphism of the regional type and not purely thermal as evidenced by the development of staurolite, chloritoid and chlorite. The increase in the grade of metamorphism has been ascribed by them to be due to increase of temperature consequent upon granite intrusion. Most of the later workers have followed the same view but expressed it in different ways.

The present authors while working in the Chor area have encountered, for the first time, the outcrop of typical hornfels in the proximity of Chor granites exposed at an altitude of about 3000 m along the south-western slope of the hill. The associated granite is dirty greyish white, medium to coarse grained with typical granitoid texture and almost completely devoid of foliation. The grey coloured porphyroblasts of plagioclase are embedded in the medium grained quartzo-feldspathic groundmass which contains specks of biotite scattered in it. Sometimes fine grained micro-granites and pegmatites are also associated with it.

At the contact with granite, the psammo-pelitic and pelitic country rocks (Jutogh) exhibit distinct contact metamorphism. The psammo-pelitic hornfels is fine grained, light to dark greyish coloured, very hard and compact, with spotted appearance. Under the microscope it exhibits typical hornfelsic texture which is marked essentially by deep brown scaly biotite and needles and prisms of sillimanite disposed in bands perhaps representing the bedding, or in patches in the granoblastic quartzose matrix. Small twinned or untwinned grains of plagioclase, potassium feldspar, and anhedral cordierite usually surrounded by biotite, occur in the matrix. The cordierites contain tiny inclusions of biotite, quartz and tourmaline, sometimes showing sector twinning; the mineral is biaxial negative. Poikiloblastic spongy garnet crystals occur here and there in the rock and contain inclusion of lenticles of opaques, quartz and fine needles of sillimanite in it. Sillimanite contains streak of biotite in it, indicating that it may have formed due to dissociation of the latter. Some quartz grains in the groundmass show polygonal outline and the straight grain boundaries meet in triple-point indicating a process somewhat analogous to primary recrystallization in a annealing (Spry[4]). The main assemblage of the hornfels is quartz-biotite-sillimanite-plagioclase-garnet K. feldspar (± cordierite). The rock is almost completely devoid of muscovite or contains a few flakes of it.

The pelitic schists in the contact, on the other hand, show relict foliation or bedding marked by bands of short prisms of muscovite and biotite exhibiting decussate texture. The muscovite of later phase is superimposed over the foliation or banding. Xenoblastic garnet is spongy and often stretched in the foliation plane containing inclusions of opaques, quartz, etc. The psammitic band is however devoid of muscovite and shows hornfelsic texture. The schist essentially consists of quartz, biotite, muscovite, garnet and plagioclase.

The mineral assemblage of the hornfels represents hornblende-hornfels or pyroxene-hornfels facies condition of metamorphism. The abundance of sillimanite instead of andalusite is due to high temperature condition of metamorphism in the immediate vicinity of the granitic body (Turner and Verhoogen[5], Turner[6]).

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IRREGULAR MEIOSIS IN STRAINS OF TRITICALE

TRITICALE, although having many advantages over cultivated wheat[1], could not make a commercial impact mainly due to irregularities in cell division and some degree of sterility. So far no strain exists having meiotic stability and fertility comparable to that of wheat. It requires constant cytological evaluation for developing stable strains[2, 3]. Meiotic behaviour in some triticale strains is reported in this communication.