UGC's role in introducing astrology courses in Indian Universities

Noting correctly that 'as is customary', an 'expert' committee was formed to go into the question of introducing astrology courses in Indian universities, whose recommendations were later approved by the UGC, the editorial 'The Astrology Fallout' (*Curr. Sci.*, 2001, **80**, 1085–1086) has raised the following pertinent questions: Were there no members of the UGC who disagreed with the stated objectives of the astrology programme? Is the UGC so devoid of inputs from the scientific community that such a circular could be issued? Or is it that silence is the expedient path in such committees? After exhorting Indian scientific bodies 'not to adopt an expedient path', but to 'express a collective reasoned view' on the issue (*Curr. Sci.*, 2000, **79**, 1139–1140), the editor has also now noted with disappointment the silence of the scientific academies and has hinted that their stance is not entirely inexplicable given the gradual erosion of their autonomy and independence from the government. These indeed reflect a sad state of affairs in Indian science.

In this context, it is worth pointing out that there are three scientist-members in the UGC: A. S. Nigavekar, the Vice-Chairman of the Commission, physicist and former Vice-Chancellor of Pune University; S. K. Joshi, physicist and former Director-General of the CSIR; and Sipra Guha-Mukherjee, a molecular biologist from the Jawaharlal Nehru University, New Delhi. The latter two are Fellows of the Indian Academy of Sciences (IAS) and Joshi is a past president of the Indian National Science Academy (INSA). The Commission includes members from various disciplines to enable appropriate inputs from different fields of higher education in its deliberations and decision-making process. The implication of the UGC decision on astrology courses is that either these three scientists have tacitly lent support to the proposal or their voices, which are meant to speak for the Indian scientific community, carry no weight in the Commission's dealings.

Perhaps the editor (or President IAS) can request these scientists to enlighten the scientific community on the mode of discussions and the process of decision-making in the UGC. In fact, for the simple reason that they are supposed to represent the Indian scientific community in the Commission, they have a moral responsibility to respond unilaterally to the ongoing debate on the introduction of astrology courses. For instance, the scientific community would like to know the composition of the 'expert committee' which went into the issue and gave its recommendations. For some strange reason this, and the committee's report, have been kept under wraps by the UGC. There is a suspicion among scientists that this committee did not include any scientist, let alone an astronomer of standing.

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'The golden earth' of Karnataka

Karnataka is in the forefront of the mineral industry. Yet, the ceramic industries in Karnataka are depending on import of raw materials from other states. The raw materials for conventional/traditional sectors are clay, quartz, felspar, bauxite, soapstone, graphite, dolomite, magnesite, iron oxides, pigments, etc. Raw materials for the modern sector are celestite, zircon, chromite, silicon carbide, pyrolytic boron nitrite, gallium, arsenides, celenide, beryllium, borosilicates, carbides, byrides, etc. Hence, there is a definite need for basic/applied research partnered with geo-scientists, ceramic technologists and industrialists to consolidate the analytical results of various rock-types in the state, for classification of available resources into various grades keeping in view end-use specifications.

Equally important is the establishment of state-wise basic/applied research centres to explore various minerals and earths for effective utilization of the resources for the common man's benefit, to provide reasonable opportunities for employment and for revenue mobilization to the financial exchequer.

Karnataka ranks fourth in mineral wealth. The government of Karnataka has recently liberalized the rules to develop mining, mineral processing and beneficiation so as to provide for and to encourage establishment of ceramic industries. The state-wise production of the entire ceramic needs in every state will not only provide employment to locals, but also increase the state's revenue.

The title of this note, 'golden earth' refers to a raw material known as auriferous rock slimes, also termed as 'sand tailings', the waste after the extraction of gold, dumped at a site in Kolar Gold Fields (KGF), Kolar district of Karnataka. The bulk of the up-to-date accumulation is in the order of thirty-two million m tons (32 Mmt). About 20 to 22 million tons are lost by denudative actions, causing silting of surface land and making it unfit for agriculture and resulting in deforestation. But more importantly, environment pollution in the surrounding areas of about 15 to 20 km radius has resulted in deteriora-

Table 1. Comparative chemical composition (in %)

Golden earth		Portland cement
Silica	57.00	25.00
Aluminum oxide	17.00	08.00
Calcium oxide	09.00	60.00
Iron oxide	07.00	03.00
Magnesium oxide	–	03.00
Insoluble residue	03.00	–
Alkalies	–	01.00
Loss on ignition	07.00	–
Total	100.00	100.00

Table 2. Comparative physical characteristics

Golden earth	Portland cement
Colour	
Raw state: Silvery grey	–
Sintered state: Dark brown	Ash grey
Sp. gr. raw: 2.7	–
At 600 d.c.: 2.62	Should not be less than 3.0 at room temperature
At 900 d.c.: 2.59	
At 1000 d.c.: 2.26	
Compressive strength	
Raw: 030.6 lbs/sq. inch	
At 600 d.c.: 110.5 lbs/sq. inch	
At 900 d.c.: 268.5 lbs/sq. inch	
At 1000 d.c.: 544.0 lbs/sq. inch	
Tensile strength	
Can be developed with additive	Highly variable ranging from 240 to 320 lbs. per sq. inch

tion of the general health of the inhabitants, spreading silicosis, lung cancer and allied diseases. This serious problem can be solved by productive utilization of the golden earth.

Table 1 shows the average chemical composition from various locations of this mineral resource. Physical characteristics and puzzolonic activity of the material are summarized in Table 2.

From Table 2 the following observations are made: (i) The chemical composition of the golden earth is within the limits of a puzzolona; (ii) Pre-heat treatment is required before it can be used as puzzolonic material; (iii) After proper heat treatment, it can be used as any puzzolonic material and marketed for use in building-construction industry; and (iv) It can be used for manufacture of sand-lime refractories; cleaning compounds; abrasives; grey colour painting; colour washing; flooring; hollow blocks; stoneware sanitary wares; and as filling earth for preservation of foodgrains.

The golden earth is readily available as powder. Ninety-five per cent passes through 100 mesh and about 70 per cent through 200 mesh. The fineness is 300 sq cm/g. It can be used for production of heavy wares like hollow blocks, solid columns and reinforced slabs for walls, etc. in the building industries by addition of coarser grain substitutes by preparing a concrete mixture using Portland cement and subjecting it to water curing. The golden earth aggregate can be added with lowgrade plastic clays as a binding agent from which stoneware sanitary wares and floorings can be produced with heat treatment up to about 1000°C, to make the product vitreous and impervious. Even bottle and bangle glass can be produced. The golden earth can be used for bulk consumption by production of hygroscopic puzzolona cement for building construction. One advantage of the golden earth is its fineness. The low temperature of vitrification made up by addition of finely-ground calcined lime and other aggregates and heat treated at elevated temperatures up to 1300–1400°C results in standard puzzolona satisfying the ISI specifications.

Plant capacity design and layout for fast productive consumption is necessary for this purpose. Even with the assumption that 4000 to 5000 tons can be consumed daily, 1.2 to 1.5 million tons can be used annually and this will give an operative life of 20 years. Since most of the infrastructure facilities like water and power are readily available at the site in KGF, it will not be difficult to put up commercial and production plants most economically.

Joint venture and intense effort in coordination with ceramic, cement and mineralogical industrialists, scientists and technologists will yield positive results, mutually beneficial to all concerned. This incidentally retards environment pollution hazard automatically.

Further laboratory and research work should be undertaken at the earliest. Positive results are obtainable in a time-frame of six months. An input of Rs 15 to 20 lakhs is needed up to the point of preparing a master plan for a pilot plant. The inputs can be shared by the partners of the above scheme. This input is most minimal, considering the vast potential with multi-purpose utility.

Incidentally, in the course of ceramic processes involved in utilizing golden earth for ceramic purposes, there is a possibility of the recovery of the residual gold content as a by-product.

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