

SCIENCE NOTES AND NEWS

Award of Research Degrees

Andhra University has awarded the D.Sc. Degree in Physics to Shri B. V. Krishnamurty for his thesis entitled "Studies on Equatorial Spread F" and to Shri C. Abhirama Reddy for his thesis entitled "Studies on Polarisation of High Frequency Radio Waves"; D.Sc. Degree in Chemistry to Shri D. Purushottam for his thesis entitled "Studies on Lanthanons and Actinons (Complex formation with B. Diketenes)"; D.Sc. Degree in Geophysics to Shri B. Madhava Reddy for his thesis entitled "Studies on the Ionospheric Absorption at Waltair"; and the Ph.D. Degree in Physics to Shrimati A. Bhanumathi for her thesis entitled "Experimental Studies on (a) Eyring's Equation of Relaxation Time and (b) Hydrogen Bond Formation from Dielectric Measurements".

Gujarat University has awarded the Ph.D. Degree in Physics to Shri V. K. Thankappan of Physical Research Laboratory, Ahmedabad, for his thesis entitled "Collective Vibrations in Light Nuclei"; and to Shri S. K. Shah of Physical Research Laboratory, Ahmedabad, for his thesis entitled "Studies in Structure and Properties of Light Nuclei".

Tenth International Botanical Congress—Edinburgh, 1964

The Tenth International Botanical Congress is to be held in Edinburgh, Scotland, from 3rd to 12th August 1964. The 2nd Congress Circular, which gives details of the scientific programme and the full programme of botanical excursions, is due to be despatched in August or early September. The Congress Executive wish to inform the readers of this Journal who do not receive the circular that they may receive it by writing to the "Secretary (Executive Committee), X International Botanical Congress, 5, Hope Park Square, Edinburgh-8, Scotland". The Executive would also be pleased if they would bring this notice to the attention of any of their colleagues who they think might wish to attend the Congress.

Fluorspar in Kerala State

Dr. M. S. Krishnan, National Geophysical Research Institute, Hyderabad, writes :

Mr. P. A. Varughese of the Natural Science Department of UNESCO Office, Paris, who is on short leave in Kerala State, reports the find of

Fluorspar deposits at 4 or 5 places along the Tiruvalla-Mallapalli Road in the Alleppey District, Kerala State. The localities are in Survey of India Topo-sheet No. 58 C/11 and have been exposed by recent quarrying for road metal. The country rocks which are ancient gneisses are traversed by Pegmatite Dykes. The mineral occurs as massive veins, varying in thickness from stringers to bands up to 24" across. They are seen to extend for 3 ft. or more horizontally. The material is white and purple in colour and closely associated with quartz and feldspar. Chemical tests are reported to have confirmed the mineral as Fluorspar. Further work is in progress which will be followed by a detailed note by Mr. Varughese.

A Diploid Parthenium in Jammu

With reference to the note under the above title published in *Curr. Sci.*, 1963, 32 (6), p. 273, Shri R. S. Rao, Regional Botanist, Botanical Survey of India, Western Circle, Poona-1, writes :

Parthenium hysterophorus Linn. has already been reported by the writer in 1956 as a newly introduced weed in India (*vide Jour. Bomb. Nat. Hist. Soc.*, December 1956). From the data gathered by him it appears that this American weed made its first appearance at Poona along the Agricultural College farm area only, sometime in 1954-55, possibly through the seed material of some crop plants imported from America. This has now become, during these 9 years, the worst weed in gardens and waste places in Poona and surroundings and the writer has recently observed a few plants in the N.C.C. Academy Colony on the Purandhar hill, 30 miles from Poona, evidently transferred by human agency from Poona. During the study of the flora of Western India, the author has not so far observed this species growing in other parts of Western India.

New System for Satellite Designation

A new system for designating satellites and space probes has been adopted by the Committee on Space Research (COSPAR) at its meeting in Washington in May 1962. In the United States this system has been adopted by the National Aeronautics and Space Administration (NASA).

According to the new system, beginning from January 1, 1963, Arabic numerals will replace the Greek letters. Thus the first satellite or space probe in 1963 will be 1963-1, the second will be 1963-2, etc. The numbering will also begin anew each year.

Prior to 1963, satellites were named in the order of the letters of the Greek alphabet, beginning anew each year.

Usually the launching of a satellite places more than one object in space. The new system provides that the suffix A will identify the main satellite (the one carrying the principal scientific payload), and that B, C, etc., as needed will be used for any subsidiary scientific payloads in separate orbits, and then for inert components.

An "Active" Magmatic Ore Solution

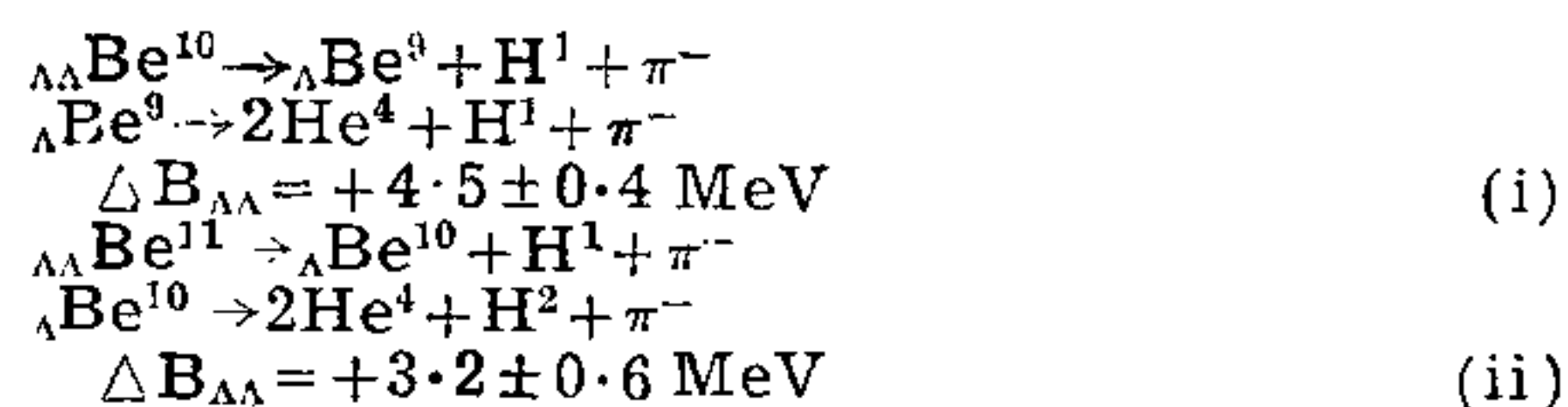
A well drilled for geothermal power to a depth of 5,232 ft. in the Salton Sea region of California has resulted in geochemical discoveries of quite unusual interest. This is the world's deepest well in a high-temperature hot-spring province, with depth temperatures in the range 270°–370° C. It taps a very saline brine of Na-Ca-K-Cl type (185,000 p.p.m. chlorine), with exceptionally high content of potassium (23,800 p.p.m.) and with perhaps the highest content of minor alkali elements known for natural waters; and it is believed that this brine may derive from the same magma chamber as furnished the late Quaternary rhyolite domes of the region, representing an undiluted magmatic water residual after the separation of a more volatile phase represented by near-surface hot-spring manifestations. During a three-month production test several tons of material precipitated in the discharge pipe, this deposit consisting dominantly of amorphous silica with iron and manganese, and abundant bornite. Chemical analyses reveal the astonishingly high content of about 15% copper, 2% silver and notable arsenic, bismuth, lead, antimony, and some minor elements. The brine may therefore be the first example of an "active" magmatic ore solution. Drill cores from 4,400 to 5,000 ft. depth contain chlorite, albite, epidote, mica and quartz, with some indication of increase of metamorphic grade downwards, suggesting that the young sedimentary rocks are undergoing contemporary metamorphism. Dr. D. E. White, of U.S. Geological Survey, is conducting geochemical investigations of the brine and drill cores.—(*Science*, 1963, 139, 919; *Nature*, 1963, 198, 1146.)

Observation of a Double Hyper-Fragment

During a systematic scan for interactions of 1.3 and 1.5 GeV/c K⁻-mesons in emulsions irradiated in the separated K⁻-meson beam at CERN, an event has been found which is interpreted as the production and subsequent mesonic cascade decay of a double hyper-fragment.

Analyses of the observed tracks have shown that the double hyperfragment decayed into a π^- -meson, a singly charged particle, and an ordinary hyperfragment. This hyperfragment again decayed into a π^- -meson and three other charged particles.

After considering various possibilities, it has been suggested that the most likely explanation of the whole sequence of events is the production of a double hyperfragment, $_{\Lambda\Lambda}Be^{10-11}$ by a Xi-minus (Ξ^-) hyperon capture on carbon followed by the decay sequences:



—(*Phys. Rev. Letters*, July 1 1963, p. 29.)

Differential Thermal Analysis of Opal

Investigations of the differential thermal analysis of opals have indicated that they show marked thermal absorption or "endotherm" with peak at about 130° C. According to J. B. Jones *et al.*, who have recently studied the differential thermal analysis of some thirty naturally occurring opaline silicas, the opals can be broadly classified into the following three groups: (1) those which show a *very small* or no apparent endotherm between 100° and 200° C., (2) those which show a *prominent but rounded* endotherm starting at 90° C. and with peak temperature in the range 125°–140° C. and (3) those which show a *strong and sharp* endotherm starting at 90° with a peak temperature of 140° C.

Most glassy opals (including precious varieties) fall into the group (1); opals which are commonly opaque come in group (2). Only two samples have been found in group (3) and these were somewhat glassy red and brown opals from different localities. They gave identical differential thermal analysis traces.

It was also observed that opals of group (1) were losing water even at 500° C., while those of group (3) were almost dehydrated at 200° C. These results indicate that most of the water is not chemically bound in opal.—(*Nature*, 1963, 198, 1191.)

New Uses for Depleted Uranium

Ordinary uranium that has been stripped of its fissionable isotope U-235 is named depleted uranium and it is a by-product of the nuclear industry. New uses are being developed for depleted uranium for applications in aerospace and other advanced technologies. Highly dense, easily machined and strong when alloyed with other metals, depleted uranium is an excellent material for balances and counterweights for aircraft and space vehicles. Because of its density, it also makes good radiation shielding. Uranium is nearly twice as dense as lead. Its only equal is tungsten, but tungsten costs more than uranium in raw form, and its brittleness makes it far more expensive to fabricate. The depleted uranium is cast, melted and machined as easily as any conventional metal. Finished products of depleted uranium offer no health or radiation problems.

Satellite Gyroscope Experiment to Test Theory of Relativity

A new experiment is being designed by scientists of the Stanford University to test Einstein's General Theory of Relativity. The experiment involves use of a frictionless, free-fall gyroscope suspended in space within a vacuum inside a satellite. The gyroscope would have neither bearings nor air to slow it down, and thus no friction. Once in rotation it would continue to spin almost indefinitely. The weightlessness of gyroscope in a "Zero-g" (Zero-gravity) satellite makes the experiment appear feasible.

The experiment requires observation of this extremely high precision gyroscope while it is in orbit in the satellite. Precise measurements would then be made of the "precession" of the gyro rotor's spin axis. This precession would be caused by the Earth's gravitational field, and is predictable according to Einstein's General Theory. In the gyroscope the axis movement should be seven seconds of arc per year. This is speeded up 15 or 16 times over the normal rate of precession because the satellite will orbit the earth that many times a day.

The apparatus would include an astronomical telescope to keep the satellite aimed at a fixed star. A long-lasting vacuum for spinning rotor

would present no great problems and the zero-g environment of space would greatly simplify the task of keeping the rotor suspended. While there are several possible means of supporting the rotor, the most promising method would be not to support it at all. The satellite would use jets to "servo" its own path through space to match the path of the rotor inside.—(*Jour. Frank. Inst.*, 1963, 275, 456.)

Drifting Continent

Fossil-magnetization and radioactive dating studies of rocks from eastern Australia and Tasmania have added new evidence that Australia was once much nearer the South Pole than it is today, and has arrived at its present location only within the past 100 million years. In that short geological span the southern continent may have drifted as much as 3,000 miles with respect to North America and Europe at a rate approaching two inches a year.

In these studies several hundred specimens from more than a score of sites in four areas of eastern Australia and one site in Tasmania were investigated. The samples included sedimentary, igneous and volcanic rocks ranging in age from 93 million years to well over 200 million years. All were tested for *remanent magnetization*, and where possible, samples from each area were also dated by the potassium-argon method.

The specimens from all five areas point to a location for the South Pole much closer to Australia then than now. This location, however, differs by nearly 50° from positions for the Pole derived from similar studies of North American and European rocks of comparable age.

The conclusion is either that the earth's magnetic field then had some unusual configuration (with more than the present two poles) or that Australia has since moved. It is to be noted that other paleomagnetic studies, involving younger rocks, suggest that Australia began to move about 100 million years ago, not long after the postulated date for the breakup of the supercontinent of which advocates of continental drift believe Australia was once a part.—(*Sci. Amer.*, June 1963.)

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