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COMPARATIVE MEASUREMENTS OF THE TEMPERATURE DERIVATIVES OF VISCOSITY, DENSITY AND REFRACTIVE INDEX OF PURE LIQUIDS AND SOLUTIONS

Part VI.—Dilatometric Measurements on n-Amyl Alcohol and Isoamyl Alcohol with 1°C Interval and in the Range of 20°C–70°C

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(Received April 30, 1969)

This communication presents refined measurements of coefficient of dilatation, $\beta(=dV/V_o dT)$, with 1°C interval in the range of 10°–70°C, on n-amyl alcohol and isoamyl alcohol. The variations in the value of β with temperature show a roughly sinusoidal component with an average cycle of 4.9°C and 5.3°C and an amplitude of 0.1 units of $\beta \times 10^4$. Comparison of the previously reported mean temperatures of minima in E/R and $-dn/dt$ (cf. ref. 6) with temperatures at minima in the graphs of coefficient of dilatation show that there is reasonable one-to-one correspondence, the minima in β being ahead of those in E/R and $-dn/dt$ by 2.4°±0.4°C, i.e. almost exactly half a cycle. Thus, the minima in E and $-dn/dt$ correspond within the limits of present accuracy with the maxima in β.

Pakistan J. Sci. Ind. Res., **12**, 181–185 (1969)

COPOLYMERIZATION

Part II.*—Copolymerization of Acrylonitrile and Trichloroethylene

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Acrylonitrile (A) has been copolymerized with trichloroethylene (B) using benzoyl peroxide as initiator at 75°C. The reactivity ratios found by the method of Mayo and Lewis are $r_A = 62.1 \pm 3.5$ and $r_B = 0$. The theoretical curve obtained by using these values of reactivity ratios fits well to the experimental results. The determination of the mol wt and the chlorine analysis of the polymer indicate that the reaction product is a copolymer, not a telomer. Kinetic analysis has shown that at the initial stages of the reaction the time rate of acrylonitrile entering the copolymer is enormously faster than that of trichloroethylene whereas at the later stages when most of the acrylonitrile monomer is consumed both the time rates become comparable to each other. Further, evidence has been found that trichloroethylene homopolymerizes in the presence of benzoyl peroxide initiator at 75°C.

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COPOLYMERIZATION

Part III.—Copolymerization of Acrylonitrile and Tetrachloroethylene

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(Received October 22, 1968)

A study has been made of the copolymerization of acrylonitrile and tetrachloroethylene in the presence of 1% (w/w) benzoyl peroxide at 50 and 75°C. The rate of copolymer formation is found to increase with the increase of acrylonitrile concentration. The increase in tetrachloroethylene concentration does not appreicably increase the incorporation of chlorine in the resulting copolymer. The monomer reactivity ratios at 75°C are $r_1=456\pm70$ and $r_2=0$. The mol wt determination of a copolymer sample has shown that the polymerization product is a copolymer not a telomer. The copolymer decomposes into insoluble black products between 200 and 218°C without showing any softening point.

Pakistan J. Sci. Ind. Res., **12**, 191–194 (1969)

POLAROGRAPHIC STUDIES OF LEAD COMPLEXES WITH THIOUREA IN AQUEOUS MEDIUM

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(Received December 10, 1968)

Coordination complexes of thiourea with lead(II) ion in aqueous solution have been studied by polarographic method at 10, 25, and 35°C, using Triton-X-100 as maximum suppressor, and 0.1M potassium nitrate as supporting electrolyte. The formation constants were evaluated by applying the DeFord and Hume method.[1] The results, indicated the existence of mono-, bis-, tris-, and tetrakis-coordinated species for lead(II) thiourea complexes.

Pakistan J. Sci. Ind. Res., **12**, 195–200 (1969)

THE IR AND UV SPECTRA OF ALKYLTRIPHENYLARSONIUM COMPOUNDS

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The IR and UV spectra of the methyl, ethyl, n-propyl and n-butyl-triphenyl- and tetraphenyl, arsonium compounds have been recorded. The neighbouring group effect is noted from the variation in the intensity of the 1430 and 1000 band with the alkyl chain. The UV studies support the findings of the IR spectra and indicate dissymmetry in the molecules.

Pakistan J. Sci. Ind. Res., **12**, 201–202 (1969)

NONALKALOIDAL CONSTITUENTS OF BUXUS PAPILOSA

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(Received August 17, 1968; revised October 11, 1968)

Two new steroidal alcohols provisionally named and formulated as buxpapinol, $C_{27}H_{46}O$, m.p. 183–184°C, and buxpapininol, $C_{22}H_{36}O_2$, m.p. 248–251°C, have been isolated from the alcoholic extracts of *Buxus papilosa*.

Pakistan J. Sci. Ind. Res., **12**, 203–205 (1969)

EFFECT OF HOST PLANT ON THE CHEMICAL COMPOSITION OF CUSCUTA REFLEXA ROXB

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(Received October 8, 1968; revised October 30, 1968)

Cuscuta reflexa Roxb. collected from *Zizyphus jujuba, Clerodendron inerme, Citrus medica* and *Accacia arabica*, has been investigated with a view to examining if its composition changes with the change in the host. Petroleum ether, diethyl ether, ethanol and water extractives of the parasite have been examined for their composition. No influence of the host plant has, so far, been found on the chemical built-up of this parasitic climber.

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CHEMICAL INVESTIGATIONS OF THE PAEONIA EMODI TUBERS

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(Received December 30, 1968; revised January 11, 1969)

The tubers of *Paeonia emodi* have been shown to contain salicylaldehyde, a fixed oil, starch, sucrose, fructose, glucose, benzoic acid and an unidentified substance giving different coloration at different pH. β-Sitosterol is the major constituent of the non-saponifiable matter of the fixed oil, while the saponifiable portion contains unsaturated fatty acids of C_{16} and C_{18} series.

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PRODUCTION OF ELECTROLYTIC LEAD POWDER

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(Received March 21, 1968; revised September 29, 1968)

Lead powder has been prepared by electrodeposition from baths of different electrolytic media, e.g., NaCl–$PbCl_2$; NaCl–KCl–$PbCl_2$; $CaCl_2$–$PbCl_2$ using graphite electrodes and NaOH using lead as electrodes. The limit of the optimum operating variables studied for $CaCl_2$–$PbCl_2$ electrolyte were: temperature of bath 50–55°C, current density 5–6 amp/dm^2; lead chloride 20 g/l, and pH 5–6.

Use of NaOH as electrolyte (160–180 g/l), lead electrodes at a current density of 5.5–6.2 amp/dm^2 with the addition of 10–30 ml/l NH_4OH (sp. gr., 0.88) produced an easily detachable spongy deposit at bath temperature 25–27°C.

Pakistan J. Sci. Ind. Res., 12, 213–216 (1969)

SALINITY APPRAISAL IN SOME SOILS OF SUKKUR DISTRICT, WEST PAKISTAN*

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(Received December 3, 1968)

This paper deals with some characteristics of salt-affected soils of Sukkur District in West Pakistan. The electrical conductivity, saturation percentage, sodium adsorption ratio and exchangeable sodium percentage of some of these soils have been discussed.

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EXTRACTABLE ALUMINIUM CONTENT IN SOME HAWAIIAN SOILS

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(Received September 27, 1968)

Extractable aluminium in 22 soil samples from a transect on the northern slope of Kawailoa ridge in the Hawaiian islands was determined with four different extracting solutions such as distilled H_2O, N KCl, N NH_4COOCH_3) and $Ba(COOCH_3)_2$. The last two solutions were buffered at pH 4.8. According to the extracting power the solutions may be arranged in decreasing order as follows:

$$Ba(COOCH_3)_2 > N\ NH_4COOCH_3 > N\ KCl > H_2O.$$

All the solutions extracted higher amount of aluminium from the subsoils than those in the surface soils. In the soils where the pH was low the extractable aluminium content was high with all the extracting solutions except distilled water. Extractable aluminium was low where the pH of the soil was below 6.0. Although N NH_4COOCH_3 and $Ba(COOCH_3)_2$ solutions were buffered at pH 4.8, the extractability of aluminium depended on original pH of the soils. There are positive correlations between extractable aluminium with N KCl and $Ba(COOCH_3)_2$ solutions, and also between extractable aluminium with N NH_4COOCH_3 and $Ba(COOCH_3)_2$ solutions. The amount of aluminium in the sugarcane sheaths ranged from 14 to 47 ppm.

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A STUDY OF MINERALS IN SOME HAWAIIAN SOIL COLLOIDS*

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(Received November 21, 1968)

This work deals with the mineral content in the clay fraction of a number of soils in the Tropics. Kaolinite is found to be the dominant mineral. The presence of pedogenic mica in high rainfall area is reported.

Pakistan J. Sci. Ind. Res., 12, 227–228 (1969)

SOYABEAN AND RAPESEED GROWN IN THE HYDERABAD REGION, WEST PAKISTAN

The Oil Content and its Quality in Different Varieties

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(Received July 16, 1968; revised December 7, 1968)

The oil contents and analytical constants of the oils of some promising varieties of soyabean and rapeseed grown in the Hyderabad Region, were determined. K-30 variety of soyabean and S-9 variety of rapeseed gave the highest oil percentage and the lowest acid values.

Pakistan J. Sci. Ind. Res., 12, 229–231 (1969)

JUTE RETTING BACTERIA FROM CERTAIN RETTING DITCHES OF EAST PAKISTAN

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(Received July 7, 1967; revised December 3, 1968)

The action of different aerobic and anaerobic bacteria on green jute was studied and only *Clostridium tertium*, *Cl. lacunarum*, *Cl. lactoacetophilum*, *Cl. histolyticum*, *Bacillus coagulans*, *B. circulans*, *B. polymyxa*, and *B. megaterium* retted jute. Their retting properties and physiological characters are described.

Pakistan J. Sci. Ind. Res., **12**, 232–235 (1969)

BIOSYNTHESIS OF PORPHYRINS BY BACTERIA

Effect of Metals on the Synthesis of Porphyrins from δ-aminolaevulic acid by Cells Suspension of Micrococcus colpogenes

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(Received October 17, 1968)

The effect of four divalent cations on the synthesis of porphyrins from δ-aminolaevulic acid by cell suspension of *Micrococcus colpogenes* was studied. Fe^{2+} had maximum stimulatory effect, with 90% increase in synthesis, and was followed by Ca^{2+} (73.5% increase) and Mg^{2+} (60.7% increase). Cu^{2+} was quite inhibitory and reduced the activity of the cells to only about 10%. The effect of different cations was different on different enzymes of the pathway. Formation of coproporphyrin was greatly increased in the presence of both Fe^{2+} and Ca^{2+} but most protoporphyrin accumulated only in the presence of Fe^{2+}. Cu^{2+} was inhibitory, particularly, for the enzymes catalyzing the synthesis of uroporphyrin from δ-aminolaevulic acid.

Pakistan J. Sci. Ind. Res., 12, 236-238 (1969)

NUTRITIONAL REQUIREMENTS OF STREPTOMYCES ROSEOCHROMOGENES FOR CYCLOSERINE PRODUCTION

Part I.—Effect of Carbon and Nitrogen Sources

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(Received July 15, 1968; revised November 20, 1968)

The biosynthesis of cycloserine by different species of *Streptomyces* was studied. *Streptomyces roseochromogenes* produced maximum amount of cycloserine. Organic nitrogen sources such as urea or peptone gave better results of cycloserine production than inorganic nitrogen sources. Of the six carbon sources, starch was most suitable for optimum yield of antibiotic.

Pakistan J. Sci. Ind. Res., 12, 239-243 (1969)

COPROPHILOUS FUNGI OF WEST PAKISTAN

Part III. Karachi

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(Received October 16, 1968)

In continuation of the studies of coprophilous fungi from West Pakistan, eleven more species have been reported. Ten of them belong to Ascomycota and one to Myxomycota. These consist of *Ascobolus leveillei* Boud., *A. stercorarius* (Bull.) Schrot., *Ascophanus ochraceus* (Crouan) Boud., *Chaetomium caprinum* Bainier, *C. funicolum* Cooke, *Delitschia vulgaris* Griff., *Podospora inflatula* Cain, *Sporormiella minima* (Auersw.) Ahmed and Cain, *Sp. pseudominima* Ahmed and Cain, *Sp. tetramera* Ahmed and Cain, and *Licea tenera* Jahn.

All these species have been recorded for the first time from Karachi. *Ascobolus levellei*, *Chaetomium caprinum*, *Delitschia vulgaris*, *Podospora inflatula*, *Sporormiella pseudominima*, *Sp., tetramera* and *Licea tenera* have never been reported from West Pakistan.

Brief descriptions which could help laboratory identifications have been provided.

Pakistan J. Sci. Ind. Res., **12**, 244–248 (1969)

CHEMICAL CONTROL OF RICE BLAST CAUSED BY PIRICULARIA ORYZAE CAV

Part I.—Effect of Several Foliar Fungicides on P. Oryzae in Vitro

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(Received October 25, 1968)

The relative merits of several fungicides potentially effective against foliar diseases were evaluated in the laboratory for their effectiveness against *Piricularia oryzae*. All fungicides tested inhibited spore germination when used at a concentration of 200 ppm, but only four products were effective at 100 ppm or less: Blasticidin-S (an antibiotic from *Streptomyces griseochromogenes* Fukunaga), PMA (phenyl mercuric acetate), Actidione (cycloheximide) and Du-Ter W-50 (triphenyl tin hydroxide). Similarly, only these 4 materials were highly effective on the growth of *P. oryzae* and retarded mycelial growth at concentration as low as 50 ppm. Because of its selectivity, the growth-inhibition test is preferable to the spore-germination test as a primary means of selecting potential rice blast fungicides.

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CHEMICAL CONTROL OF RICE BLAST CAUSED BY PIRICULARIA ORYZAE CAV

Part II.—Fungicidal Effect of Selected Fungicides Against Rice Blast in-Vivo

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(Received October 25, 1968)

The performance of several foliar fungicides against rice blast was determined under greenhouse and field conditions. Because of the varying degrees of phytotoxicity observed, the maximum concentration of each of the candidate fungicides causing little or no phytotoxicity was determined. Actidione was phytotoxic even at a rate as low as 25 ppm. PMA caused slight injury at 75 ppm and was very injurious at 150 ppm. Du-Ter W-50 was slightly phytotoxic at 250 ppm and injurious at 500 ppm. Blasticidin-S was essentially nontoxic at 40 ppm. Phytotoxicity was enhanced when the treated plants were held in a humidity chamber. Blasticidin-S, Du-Ter W-50 and PMA were all protectants and significantly controlled leaf blast. In field trials, Blasticidin-S, PMA and Du-Ter W-50 reduced neck infection. In a moderate blast epiphytotic, the yield was significantly increased by these fungicides. In general, two-spray applications were better than one. A single application of Blasticidin-S was more effective than two applications of each of the other materials except Du-Ter W-50. An interval of 6 days between first and second spray applications was found to be a realistic time interval for application of fungicides. Mild outbreaks of blast are related to fewer conidia in the atmosphere and no striking build-up of conidia developed through the susceptible stages of plant growth.

Pakistan J. Sci. Ind. Res., 12, 257–259 (1969)

THE GENUS FUSARIUM LINK

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A key is proposed to identify the species of *Fusarium* taking into account the modifications of Wollenweber's classification made by Synder and Hansen.

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A NEW GENUS AND TWO NEW SPECIES OF NIRVANINAE (CICADELLIDAE—HOMOPTERA) FROM PAKISTAN

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(Received October 30, 1968)

The subfamily Nirvaninae has not been so far reported from Pakistan. The Indian species of the subfamily are poorly described and with uncertain relationships. The genus *Quercinirvana*, **n. gen.** has been recorded from both East and West Pakistan. Presently two new species (*Q. longicephala*, **n. sp.** and *Q. bengalensis*, **n. sp.**) of the genus have been described. The genus appears close to the genera *Nirvana* kirkaldy and *Kana* Distant.

Pakistan J. Sci. Ind., Res., 12, 264–267 (1969)

HISTOCHEMICAL STUDIES OF PHOSPHOMONOESTERASES IN DIFFERENT TISSUES OF DESERT LOCUST, *SCHISTOCERCA GREGARIA* (FORSKAL)

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(Received October 7, 1968)

Acid and alkaline phosphatases were demonstrated histochemically in various tissues of the desert locust using naphthol AS-phosphates as substrates. Sharp localization of phosphatase activity as insoluble red (acid phosphatase) or blue (alkaline phosphatase) chromogens resulted. Distinct acid phosphatase activity was localized in neurons while moderate alkaline phosphatase activity was mostly localized in the neuropile mass of the brain.

The cuticle was devoid of both of these enzymes. The cardiac muscles showed weak acid and no alkaline phosphatase activity. The pericardial cells were positive for acid phosphatase and negative for alkaline phosphatase. Haemocytes and haemolymph showed no phosphatase activity.

The tracheal and muscular systems were devoid of both enzymes. Some of lobes of the adipose tissue showed weak acid and faint alkaline phosphatase activity. The functional aspect of these organs has been correlated with the physiological distribution of the phosphatase enzymes.

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FISHES OF THE ORDER SYNGNATHIFORMES

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(Received October 31, 1968).

Some fishes, belonging to the Order Syngnathisformes were collected from Pakistan waters. These were placed under families Aulostomidae, Fistularidae, Centriscidae and Syngnathidae. Since these are small and live usually in the sea weeds, few are caught by the fishermen. As food also these fishes are not considered good. Their habits are also briefly described.

Pakistan J. Sci. Ind. Res., **12**, 272-278 (1969)

THE BRACHYURAN LARVAE OF W. PAKISTAN HATCHED IN THE LABORATORY

Part II.—Portunidae: *Charybdis* (Decapoda: Crustacea)

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(Received September 9, 1968; revised October 14, 1968)

Prezoea and first zoea of four species of swimming crabs (family Portunidae) of sub-family Lupinae are obtained by rearing the female in the laboratory. They are described here.

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THE LARVAE OF ELAMENA (HYMENOSOMIDAE) AND PINNOTHERES (PINNOTHERIDAE) HATCHED IN THE LABORATORY (DECAPOD : CRUSTACEA)

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(Received September 5, 1968)

Only one specie of the family Hymenosomidae and one of the family Pinnotheridae have been hatched in the laboratory. First and third zoeal stages of *Elamena cristatipes* and first, second and third of *Pinnotheres placunae* have been figured and described.

Pakistan J. Sci. Ind. Res.. **12**, 286–293 (1969)

STUDIES ON SOME BASIC ASPECTS OF UTILIZATION OF SUINT RECOVERED FROM PAKISTANI WOOLS

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(Received August 17, 1968)

Suint contents of four of the leading Pakistani carpet wools and also of waste scouring liquors from the mills were determined. The suint obtained was calcined and analysed for the major basic ions (potassium, sodium and calcium) and the acidic ions (sulphate, chloride, silicate, phosphate and carbonate). Attempts were made to crystallize fractions from suint, as an alternative procedure to calcination, aiming at the utilization of the suint. Hydrochloric acid was found to be more effective than sulphuric acid in facilitating crystallization and the optimum pH lay between 2 to 3.

Pakistan J. Sci. Ind. Res., **12**, 294–297 (1969)

STUDIES ON THE RELATIONSHIP BETWEEN THE CRIMPS/INCH, DIAMETER AND THE STAPLE LENGTH OF CROSSBRED KAGHANI WOOL FIBRES FOR ASSESSING THE WOOL QUALITY

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(Received July 8, 1968)

Studies have been carried out on 20707 staples contained in 180 samples of crossbred Kaghani wool in order to determine a relationship between the crimps/in, diameter and staple length. Out of 20707 staples only 2567 staples showed an agreement with the standards of crimps and those of fibre fineness. It was found that the crimp frequency varied between 10–12 crimps/in and 1–2 crimps/in with mean diameters of 16.5μ and 45.2μ and mean staple length of 1.7 and 5.0 in respectively. The results were compared with American and English wool grades and A.S.T.M. standard for quality assessments.

Pakistan J. Sci. Ind. Res.. **12**, 298-302 (1969)

STABILITY AND MODIFICATIONS OF WOOL CRIMP AND THEIR EFFECTS ON FELTING AND COMPRESSION

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(Received August 24, 1968; revised October 24, 1968)

Samples of two wools Merino and Southdown differing widely in crimp form were treated in ether, alcohol, water at 21°C and 40°C, sodium iodide, formic acid and thioglycollic acid and their crimp parameters measured. Felting and compressional tests were also carried out on these treated wools. The relationships among felting, compressional load and crimp form were investigated.

Pakistan J. Sci. Ind. Res., **12**, 303–306 (1969)

A STUDY OF ELEPHANT GRASS (TYPHA ELEPHANTINA ROXB) FOR TEXTILE PURPOSES

Part I.—Physical and Chemical Examination of the Fibres

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(Received June 13, 1968; revised October 2, 1968)

Typha elephantina Roxb (elephant grass) is a leaf fibre cheaply and abundantly available in Pakistan. In order to assess its suitability for textile manufacture, some of the important fibre characteristics were studied. A detailed study of fibre diameter was undertaken. The rheological properties such as breaking strength, elongation, stress, tenacity and tensile strength were also studied. Relationships of diameter to strength stress, and tensile strength were investigated. Further chemical analysis of the fibre for its major components was carried out. Keeping in view its properties, the suitability of the fibre for various textile purposes was discussed.

SHORT COMMUNICATION

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EFFECT OF A VERY SMALL QUANTITY OF LONG-CHAIN POLYMER ON THE POINT OF MAXIMUM DENSITY OF WATER

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(Received September 2, 1968; revised April 17, 1969)

SPECTRAL STUDIES ON ALKALOIDS

Part IV.—The Identification of Berbericinine Hydroiodide as Palmatine Iodide

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REGENERATION IN RELATION TO ROOT SIZE IN TARAXACUM OFFICINALE*

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(Received February 24, 1969)

OBSERVATION ON THE SEASONAL INFESTATION OF THE SUGARCANE TOP SHOOT BORERS IN EAST PAKISTAN

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ACHERONTIA STYX WESTV. LEPIDOPETRA: SPHINGIDAE

A Pest of Medicinal Plants – Two New Record

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