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**A SYNTHESIS OF 2-CARBOMETHOXY-5-PENTADECYLCYCLOPENTANONE  
FROM BHILAWANOL**

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Syntheses of 2-carbomethoxy-5-pentadecylcyclopentanone and of 2-pentadecylcyclopentanone from 3-pentadecylcatechol (tetrahydrobhilawanol) is described.

**STUDIES ON THE TENSILE PROPERTIES AND THEIR INTERRELATIONSHIP  
OF HASHTNAGRI WOOL FIBRES**

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Hashtnagri wool samples were collected from the various parts of Charsadda and Mardan tehsils. Tests on breaking strength, elongation, stress, tenacity and tensile strength were conducted on the four types of wool viz. true, medullated, heterotypical and kempy. The relationship between diameter to the strength, stress and tensile strength was investigated.

**STUDIES ON THE BREAKING AND TENSILE STRENGTHS OF KAGHANI  
WOOL FIBRES AS A FUNCTION OF THEIR DIAMETER**

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Various samples of Kaghani wool fibres collected from the hill tracts of Kaghan valley and Azad Kashmir (where crossbreeding resulting from the Rambouillet and indigenous breed has improved to a considerable extent) were tested for diameter, elongation and strength. It has been observed that there is 0.978 mean coefficient of correlation between 41.73  $\mu$  mean fibre diameter and breaking strength and 0.947 mean coefficient of correlation between the same fibre diameter and tensile strength of true, heterotypical and medullated fibres of 1.6" average staple length. Similarly the mean breaking strength and elongation in per cent were 22.6 g. and 41%, respectively, against the diameter of the three types of fibres.

**A DIRECT TITRIMETRIC METHOD FOR MICRODETERMINATION OF NITROGEN  
IN BIOLOGICAL MATERIALS**

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**Nitrogen in biological materials can be determined by a Kjeldahl method without distillation. The material is digested with sulphuric acid in the presence of mercuric and potassium sulphates, and the resultant ammonium sulphate is titrated with hypochlorite.**

**STUDY OF THE YELLOW SILICOMOLYBDATE COMPLEX IN AQUEOUS SOLUTION**

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The formation and stability of yellow silicomolybdic acid, which is the basis for the colorimetric determination of silica, has been studied, in relation to factors like temperature, reaction time, acidity and reagent concentrations. Results show that, when these factors are controlled within reasonable limits, fairly satisfactory results are obtained.

## ION EXCHANGE CHROMATOGRAPHY OF IRON, ALUMINIUM, CALCIUM AND MAGNESIUM

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A method has been worked out for the rapid determination of iron, aluminium, calcium and magnesium in ores and minerals. After the removal of silica in the usual way, the mixture in concentrated hydrochloric acid is added to an anion exchanger and eluted with the concentrated acid to remove aluminium, calcium and magnesium. Finally, iron is eluted with dilute hydrochloric acid. **The mixture of the three cations ( $Al^{+++}$ ,  $Ca^{++}$ ,  $Mg^{++}$ )** is then absorbed in a cation exchanger and successfully eluted with hydrochloric acid in the order of  $Mg^{++}$ ,  $Ca^{++}$ ,  $Al^{++}$ . Usual volumetric and colorimetric determinations are made on the separated ions.

## THE CONCEPT OF MATTER WAVES, ELECTROMAGNETIC WAVES AND SCATTERING

### Part I.—A Re-examination of de Broglie's Theory of Matter Waves

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The basic postulates of wave mechanics are examined critically, and it is proposed that a more satisfactory formulation can be given by combining the fundamental de Broglie postulate  $\lambda = h/mv$  with two new postulates namely that the velocity of the waves associated with the particle is equal to the velocity of the particle, and

their frequency  $\nu$  is given uniquely by  $h\nu = \frac{m_0 v^2}{\sqrt{1 - \frac{v^2}{c^2}}}$ .

These postulates lead to the results that the total energy  $E = \frac{m_0 c^2}{\sqrt{1 - \frac{v^2}{c^2}}}$  is distributed between the particle

and the associated waves in a manner that makes the energy localized in the particle equal to  $m_0 c^2 \sqrt{1 - \frac{v^2}{c^2}}$ , while more and more of the energy appears in the wave form as  $v$  tends to  $c$ , the velocity of light, and that the "density" of the material of a particle is invariant with respect to Lorentz transformations.

**A COMPARATIVE ASSESSMENT OF MALIR SAND AS A FINE AGGREGATE IN  
BUILDING CONSTRUCTION**

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AND

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Various physical and chemical tests carried out on the sand from the river bed of Malir near Karachi indicate that **although it is essentially a calcareous aggregate, yet it is suitable for building construction.** Properties like grading, soundness, voids and specific weight of the aggregate, compressive strength, autoclaving and fire endurance of cement sand mortars have been compared with other siliceous fine aggregates.



**FLEXURAL STRENGTH OF PLAIN CEMENT CONCRETE**

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The flexural strength of cement concrete at different periods during curing is affected by water used in mixing and aggregate proportion in a similar way as the compressive strength. The best water-cement ratio in the usual mix of 1:2:4 cement, fine and coarse aggregate (by volume) is 0.7. The flexural strength is directly proportional to the compressive strength and is roughly 21% of the latter.

**EVALUATION OF INDIGENOUS PLASTER OF PARIS AND THE EFFECT OF  
ACCELERATORS AND RETARDERS ON ITS PHYSICAL PROPERTIES**

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Received December 4, 1962)

The quality of indigenous Plaster of Paris has been evaluated by determination of the quality factor,  $q$ , introduced by Schiller. The influence of retarders and accelerators on the setting time and the physical properties has been studied. From the results it is shown that the quality of local plaster is inferior and needs improvements. The study of retarders and accelerators has brought out the interesting observation that the physical properties of the retarded plaster appears to depend only on the setting time of the plaster and is independent of the retarder used.

**A PHARMACOGNOSTIC STUDY OF WITHANIA RADIX**

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**MARBOLITE – A NEW SYNTHETIC MATERIAL. Part I**

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RIAZ ALI SHAH, *Chemistry Division*

AND

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**A SURVEY OF FRUITS IN THE NORTH WESTERN REGIONS OF WEST PAKISTAN**  
**Part II\***

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**PROXIMATE COMPOSITION OF CITRUS FRUITS GROWN IN CITRUS AREAS OF WEST PAKISTAN**

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(Received May 9, 1962)

# **A SURVEY OF MEDICINAL PLANTS OF SWAT VALLEY**

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**A PHYTOCHEMICAL SURVEY OF SOME OF THE PLANTS OF NORTH WESTERN PART  
OF WEST PAKISTAN**

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# **THE CHEMICAL COMPOSITION OF THE MAKERWAL COAL AND ITS ASH**

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## **PREPARATION OF ALLYL CYANIDE**

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