

**GERMINATION OF CONIDIA OF *CERCOSPORA CRUENTA* ON LEAVES  
OF *VIGNA SESQUIPEDALIS***

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A comparison of the percentage germination of conidia of *C. cruenta* on leaves of four different varieties of beans revealed that a high level of germination occurred on the leaves of variety Hawari. Germination was studied at 20°C, 25°C and 30°C and the conidia were found to germinate better at 25°C. Maximum germination was observed at 100% r.h. although few germinated at lower relative humidities and none at 0% r.h. With increase in free moisture period, percentage germination also increased but beyond 6h periods of leaf wetness did not have any increased effect on germination.

There was no difference in the upper and lower leaf surfaces and on leaf tissues, kept in light or dark. Conidia failed to germinate on young leaves but on mature leaves they germinated to similar extent.

Effects of some fungicides on germination of conidia on leaves were also investigated.

It is reasonable to assume that the first process involved after the generation of the bare surface is adsorption of water molecules on the surface. This is followed by the film growth and diffusion at longer times. The initial adsorption process is governed by an exponential decay curve. The subsequent film growth follows a model proposed by Fleischmann & Thirsk for instantaneous nucleation and growth. Analysis of current-time transients showed that for a typical value of rate constant  $k=10^{-6}$  mol cm<sup>-2</sup> s<sup>-1</sup>, the number of nuclei varied between  $1.49 \times 10^6$ – $2.53 \times 10^6$  nuclei cm<sup>-2</sup> for the metals investigated. This value is very much lower than  $10^{18}$  atom cm<sup>-2</sup> needed for monolayer coverage thus showing that a single nucleus of the film is covering a large number of surface metal atoms.

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### THE EFFECTIVENESS OF SOME $\alpha$ , $\beta$ UNSATURATED ALDEHYDES AS PICKLING INHIBITORS

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Descaling of steel objects in many cases is accomplished by "pickling", which consists of immersion of the material in an acid solution. Pickling causes the loosening of the scale and its detachment through gas development. Pickling also gives rise to high dissolution rates of the metal and its embrittlement due to hydrogen entry into the material. It has therefore been a common practice to employ pickling inhibitors to suppress metal dissolution and hydrogen evolution during pickling.

Aromatic amines and long-chain n-alkyl ammonium salts are the main constituents of most of such inhibitors. Aromatic aldehydes have also been found to inhibit corrosion of metals in HCl media to some extent.

The present paper deals with a comparative study of the effectiveness of cinnamaldehyde and citral as inhibitors with respect to "Rhodine", a commercial pickling inhibitor used in the Ceylon Steel Corporation. The experimental medium consisted of 18% HCl with varying inhibitor contents of 0.005%, 0.01%, 0.05%, 0.1% and 0.5%. For each of these inhibitor concentrations the corrosion currents were estimated by the extrapolation of potentiostatic Tafel lines. Corrosion currents were also independently evaluated through the polarization resistance measurements. The inhibitor efficiencies were compared to ascertain the effectiveness of inhibition of the inhibitors investigated.

It was found that the inhibitor efficiency with Rhodine was 99.8% while cinnamaldehyde and citral gave efficiencies of 97% and 79.2% respectively at 0.5% inhibitor concentration. Thus, cinnamaldehyde appears to be nearly as effective as the commercial inhibitor Rhodine in its efficiency.

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### CHROMATOGRAPHIC DETERMINATION OF ISOSTERIC HEATS OF ADSORPTION OF AROMATIC HYDROCARBONS ON SILICA GEL

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A gas chromatographic method has been used to obtain adsorption isotherms and isosteric heats of substituted benzenes on silica-gel.

Samples were injected using a micro-syringe. Chromatographic data obtained was used to construct adsorption isotherms in the temperature range 250–320°C. The isotherms were found to be essentially linear (in accordance with Henry's law) for the full range of coverage studied.

Isosteric heats determined by applying Clausius-Clapeyron equation gave heats which are essentially independent of coverage. Values recorded for benzene, toluene, m-xylene and mesitylene were 52, 57, 62 and 66 kJ mol<sup>-1</sup>. This regular increase in heat can be attributed to the increasing number of methyl groups attached to the nucleus: their electron repelling nature causes an increase in the density of the pi-electron cloud of the aromatic hydrocarbon. It has been reported that these hydrocarbons form a pi-bond with the lone pairs on the hydroxyl groups on the surface of the silica-gel. The increasing heat can therefore be reasonably explained as being due to the increased strength of this pi-bond giving rise to an increasingly strong (though weak) chemisorption bond.

Similar studies on cyclohexane gave a heat of only 37 kJ mol<sup>-1</sup>. Since similar pi-bond type interactions are not possible in this case, adsorption is possible only by physisorption.

## SECTION E

### E-48 21 ( $\alpha$ ), 29-DIHYDROXYFRIEDELAN-3-ONE—A NEW TRIOXYGENATED FRIEDELAN FROM *SALACIA RETICULATA* (CELASTRACEAE)

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We report the isolation and characterisation of a new triterpene 21 ( $\alpha$ ) 29-dihydroxyfriedelan-3-one (mp 280–282°C, ( $\alpha$ )  $D_{40}^{20}$ ) from the benzene extract of the outerbark of *Salacia reticulata*, in addition to the previously reported friedelin; canophyllal; canophyllol; 3,29-dioxofriedelan; 29-hydroxyfriedelan-3-one; 3-oxofriedelan-29-oic acid; friedelan-3, 21-dione; 21 ( $\alpha$ )-hydroxyfriedelan-3-one and pristimerin.

Since the compound was very insoluble in common organic solvents it was acetylated and studies carried out on the acetyl derivative. Spectroscopic evidence suggested the presence of a ring acetoxy group and an angular methyl-oxygenation in the form of a  $-\text{CH}_2\text{OAc}$  group. Deacetylation followed by  $\text{CrO}_3$ /pyridine oxidation gave a diketo-aldehyde, the  $-\text{CHO}$  signal at  $\delta$  9.6 in the p.m.r. spectrum confirming the angular methyl-oxygenation. The comparison of spectral data with the known dioxygenated friedelans and chemical transformations confirmed the position of the alcohol groups as 21 ( $\alpha$ ) and 29.

### E-49 NEW TRIOXYGENATED FRIEDELANES FROM THE BARK OF *ELAEODENDRON GLAUCUM* (CELASTRACEAE)

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and

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*Elaeodendron glaucum* is a plant of medicinal importance. The leaves are found to have a sternutatory and fumigatory action. They are also used as a snuff to relieve headache. The gum from the plant dissolves in water to give an adhesive. The seeds and bark of this plant had been investigated previously and seven friedelane derivatives were reported from the bark. These include friedelin, canophyllal, friedelan-3-on-25-al, friedelan 3 $\beta$ -ol, elaeodendrol (17 $\beta$ -dihydroxy-28-norfriedelan-3-one), canophyllol, friedelan-3-on-25-ol and the trioxxygenated friedelane, elaeodendradiol (17 $\beta$ , 25-hydroxy-28-norfriedelan-3-one).

Our investigation to compare the bark constituents of *Elaeodendron glaucum* with those of the closely related species *Elaeodendron balae* revealed the presence of three further friedelane derivatives of which two are new trioxxygenated derivatives and the other is a friedelan-3-on-30-ol. Whereas elaeodendradiol has been reported from the same species, we could not isolate this compound.

These trioxxygenated friedelane derivatives were a ketodiol and a dioxo-alcohol. The keto diol could be selectively oxidised to the dioxoalcohol. One of the oxo groups of the dioxo alcohol was shown by NMR to be an aldehyde group. The chemical evidence suggests that the keto diol is 25, 28-dihydroxy friedelan-3-one and the dioxo alcohol is 3, 28-dioxo friedelan-25 ol.

### E-50 QUINONES FROM *ARISTEA ECKLONII* (IRIDACEAE)

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*Aristea ecklonii* (Iridaceae) is a perennial herb growing in the hill country. The major quinonoid compound present in the rhizomes of this plant has been reported to be plumbagin.

The cold dichloromethane extract of the dried rhizomes and the roots of *Aristea ecklonii* after chromatographic separation afforded plumbagin and another hydroxy quinone which was identified as 3,3' biplumbagin.

Plumbagin (m.p. 75–77°C) was identified by comparison with an authentic sample (m.p. mixed m.p., <sup>1</sup>H NMR IR).

Acetylation of plumbagin was carried out using acetic anhydride in pyridine. This afforded pale yellow crystals m.p. 110–111°C, the identity of which was established by comparison with an authentic sample (m.p., mixed m.p. and co TLC).

3–3' biplumbagin obtained as dark yellow crystals (mp. 215–216°C) was characterised by comparison of spectroscopic evidence (UV, IR <sup>1</sup>H NMR and MS).

A tetralone (mp 158–160°C) was also isolated and identified as isoshinanolone, the structure of which was confirmed by comparison of spectral data and by the DDQ oxidation in dioxane which yielded plumbagin.

Structural studies on another quinone (dark red crystals m.p. 193–195°C) (which indicates it to be a hydroxy quinone) are in progress.

### E - 51 PROTON NMR SPECTRUM OF 1, 1-DI (PROP-2-ENYL)-2 (1H)- NAPHTHALENONE

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The title compound was prepared by treating an alkaline solution of 2-naphthol with two moles of allylbromide at room temperature. Separation of the reaction mixture by preparatory thin layer chromatography gave 1,1-di(prop-2-enyl)-2(1H)-naphthalenone as the major compound. The usual Claisen rearrangement product, 1-(prop-2-enyl)-2-naphthol was also isolated as the minor product. The structures of the reaction products were confirmed by their proton NMR, IR and MS data. The allylic protons (4H) of 1,1-di(prop-2-enyl)-2(1H)-naphthalenone appeared as a multiplet in the region  $\delta$  2.3–3.1, whereas the benzylic protons (2H) of 1-(prop-2-enyl)-2-naphthol appeared as a multiplet in the region  $\delta$  3.6–3.9.

Two natural products having a 2,2-diisoprenylated cyclohezen-1-one moiety fused to benzopyrones have been recently characterised. They are zeyloxanthone, hermonionic acid. Comparison of their proton NMR, data with those for 1,1-di(prop-2-enyl)-2(1H)-naphthalenone, 1-(prop-2-enyl)-2-naphthol and another synthetic compound 4-hydroxy-1,1,3-tri-(3-methylbut-2-enyl)-2-oxo-1,2-dihydroxanthone-5-one raises doubts regards the structure proposed for hermonionic acid.

### E - 52 CHEMICAL INVESTIGATION OF THE LEAF EXTRACTION OF THREE CALOPHYLLUM SPECIES (GUTTIFERAE)

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The leaf extractive of *C. thwaitesii*, *C. moonii* and *C. bracteatum* have been chemically investigated.

From the leaf of *C. thwaitesii*, calozeylenic acid 2(R), 3(R)-2,3-Dimethyl-5-hydroxy-6-(3-methylbutanyl)-6-(2,7-dimethylocta-3,6-dienyl)-7-oxo-8-(2-carboxy-1-phenylethyl)-2,3,6,7 tetrahydrobenzo-4-pyrone, a sitosterol ester, sitosterol, friedelin and canophyllol have been isolated and characterised. The leaf acid is a new natural product recently characterised from the barks of *Calophyllum zeylanicum* (now named *C. lankaensis*) and *C. thwaitesii*. The occurrence of calozeylenic acid in the leaf and bark of *C. thwaitesii* if of biogenetic significance.

*C. moonii* leaf extracts had the same sitosterol ester, friedelin, (+)-cis-hydroxyinophyllide and a minor coumarin. The latter is a stereoisomer of (+)-cis-hydroxyinophyllide.

*C. bracteatum* leaf extracts contained the same sitosterol ester, friedelin and a new lupenediol.

## SECTION E

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### CALOPHYLLUM ACIDS (GUTTIFERAE)

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Acids of seven *Calophyllum* species have been investigated in this study. The bark of *C. lankaensis* (= *C. zeylanicum*) Kosterm., *C. thwaitesii* Planch and Tian., and *C. Walkerii* Wight and the pericarp of *C. Walkerii* gave the new acid, CALOZEYLANIC ACID (I), para-Toluene sulphonic acid treatment of I gave a lactone which was identified as a new lactone named calozeylanalactone, 2(R)-3(R)-2,3-dimethyl-5-hydroxy-6-(3-methylbutanyl)-10-phenyl-2,3,9,10-tetrahydro-8-pyrone (2,3-c) benzo-4-pyrone.

The bark extractives of *C. calaba* var. *worthingtonii* Stevens, *C. trapezifolium* Thw., *C. bracteatum* Thw., and *C. monii* (*C. soulattri*) Wight, gave isopetalic acid and isopetalic acid. These were first isolated from *Calophyllum opetalum* Willd.

E - 54 **TRITERPENES FROM THE LEAVES OF PLEUROSTYLIA OPPOSITA (CELASTRACEAE)**

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and

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*Pleurostyli*a was considered to be a monotypic genus, but four species have been reported recently. We have reported the isolation and structural investigation of the stem bark constituents of *Pleurostyli*a *opposita*. The isolation of the two triterpenes friedelin and epifriedelinol along with two alkaloids from the leaves of *P. africana* has also been reported. In this paper we report the isolation and identification of triterpenes from the leaves of *P. opposita*.

The benzene extract (40 g) of the leaves of *P. opposita* on column and preparative thin layer chromatography yielded an unidentified acetate (0.1 g, m.p. 50-51°), friedelin (2.4 g), epifriedelinol (2.5 g),  $\beta$ -sitosterol (0.1 g),  $\alpha$ -amyrin (0.8 g), 6 $\beta$ , 20-dihydroxy-lupan-3-one (0.1 g), 3 $\beta$ , 6 $\beta$ -dihydroxy-lup-20(29)-ene (0.15 g) and 6 $\beta$ , 28-dihydroxy-lup-20(29)-ene-3-one (0.2 g).

E - 55 **<sup>13</sup>C-NMR CHEMICAL SHIFTS OF SOME OXYGENATED LUPANE DERIVATIVES FROM PLEUROSTYLIA OPPOSITA (CELASTRACEAE)**

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Although complete assignment of the <sup>13</sup>C-NMR chemical shifts of lupenone, lupeol, 1,3-, 1,20- and 1,23-dioxygenated lupanes have been reported, chemical shifts of 6-oxygenated derivatives have not been assigned in the lupane, hpane, ursane and oleanane triterpenes. In this paper the <sup>13</sup>C-NMR chemical shifts of 3 $\beta$ , 20-dihydroxy-lupane, 6 $\beta$ , 20-dihydroxy-lupan-3-one, 6 $\beta$ -hydroxy-lup-20(29)-en-3-one, 6 $\beta$ , 28-dihydroxy-lup-20(29)-en-3-one and lup-5,20(29)-diene-3-one isolated from *Pleurostyli*a *opposita* (Celastraceae) are reported for the first time.

<sup>13</sup>C-NMR data confirmed the structures assigned to these compounds. 6 $\beta$ -Hydroxy lupane derivatives showed characteristic effects in the chemical shifts of carbons in the neighbourhood of the hydroxy group due to the electronic effect of the hydroxy group and *syn*-diaxial interaction with axial methyl groups 24, 25 and 26. The large  $\gamma$ -gauche shielding effect normally observed for hydroxy compounds was not present in the 6 $\beta$ -hydroxy lupanes studied. The methyl carbons C-24, C-25 and C-26 were shifted downfield due to their *syn*-diaxial interaction with the 6 $\beta$ -hydroxy group.

The <sup>13</sup>C-NMR data indicate that the hydroxy group at C-28 in 6 $\beta$ , 28-dihydroxy-lup-20(29)-ene-3-one, has a  $\gamma$ -gauche conformation to C-22.

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CHEMICAL CONSTITUENTS OF *TRIPHASIA TRIFOLIATA* DC

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In a continuing search for biologically active compounds from the plant sources, particularly those belonging to the family Rutaceae, several members have been investigated. From the constituents of *Triphasia trifoliata* three coumarins have been isolated, of these, umbelliferone and isomeranzin have been characterized by comparing them with authentic specimens. The structure of the new coumarin m.p. 85<sup>o</sup>, MW 348, has been established as 7-(2,3-dihydroxy-3,3-dimethyl propoxy)-8-(2-oxo-3,3-dimethyl propyl)-coumarin on the basis of UV, IR, NMR and MS data.

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ISOLATION OF SPECIOSIDE FROM *STEREOSPERMUM PERSONATUM*

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Chemotherapeutic and pharmacological activities of a large number of plants are being detected by means of a wide range of biological screens in many parts of the world. Our attention was drawn to the genus *Stereospermum*, of the family Bignoniaceae, as the methanol extracts of the members of this genus were shown to exhibit biological activities such as antiviral, hypoglycaemic and anticancer. We have isolated an iridoid glycoside from the bark of *Stereospermum persunatum*. On the basis of UV, IR, NMR, MS studies, the structure has been identified as identical to specioside isolated previously from *Catalpa speciosa*. Specioside is reported to have antifeeding activity against the gypsy moth larvae, *Lymantria dispar* L. This is the second occasion that specioside has been isolated from a natural source.

## SECTION F: SOCIAL SCIENCES

F - 01

### INFLUENCES ON ACADEMIC ACHIEVEMENT : A SRI LANKAN STUDY

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The aim of the study was to determine the relative importance of variables influencing academic achievement. With respect to developing countries, recent studies have shown relative less importance of socio-economic status (SES) in this regard, contrary to repeated findings with respect to industrialized countries.

In the present study, the academic achievement of 800 junior secondary children of 18 schools in the Kandy District was assessed in terms of Social Studies. The independent variables were SES, student attitude, school influence (e.g., teacher quality, physical facilities) and factors external to the school (e.g., peer group, mass communication). On the earlier finding with respect to developing countries, the present study hypothesised the emergence of school influence as the predominant factor influencing academic achievement. This hypotheses failed to receive support. The data gathered point to the following order of influence :

Order	Variable	% of explained variance
1	SES	62.31
2	School Influence	24.76
3	Student Attitude	10.70
4	Factors External to School	2.23
	Total	100.00

### STUDENTS' ORIENTATIONS TO LEARNING

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This paper reports work carried out during the pilot phase of an international study on 'Students' Orientations to Learning', undertaken by Britain, Japan, India, Malaysia and Sri Lanka. The major objective of the research at this stage is to examine the question: 'What motivates students to learn?'. In many different countries, for the same or different reasons there is a strong emphasis on assessment/examinations, and this seems to be a primary motivation for learning. But preliminary work in this and other countries suggests that there are other orientations to learning. At the stage of phase I of the pilot study in-depth interviews were carried out with a sample of Grade 11 and 12, (N=17) students from three schools in Colombo. This study suggests a strong social class bias in students' orientation to learning. Most of the sample find the assessment orientation of great importance but variations in its strength and the presence/absence of other orientations is very much a product of one's home and school backgrounds.

### A RE-EXAMINATION OF THE PIAGETIAN CONCEPT OF THE DEVELOPMENT OF MORAL JUDGEMENT IN RELATION TO A SELECTED GROUP OF CHILDREN IN SRI LANKA

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The study is designed to test the following hypotheses: (1) Maturity of moral judgement is directly related to chronological age; (2) The development of moral judgement is directly related to the opportunities that a child has for social activities and social maturity; (3) The sequential development that Piaget outlines for moral judgement is related to children's intellectual development. The sample consisted of 146 school-going children under 12 years of age in Grades 2, 3, 4, 5 and 6 from two schools in Kandy.

The occurrence of significance at the 5% or 10% level, was interpreted as showing a strong or high degree of relationship. Though there were areas of high relationship between maturity of moral judgement and chronological age, social maturity and intellectual development, the highest areas of significance was for social maturity and intellectual development.

In fact intellectual maturity and moral judgement showed a high degree of relationship even within each grade which was not seen when chronological age or social maturity was analysed.

F-03 **A STUDY OF THE EFFECT OF PRE-SCHOOL EDUCATION ON THE DEVELOPMENT OF THOUGHT AND PERSONAL RELATIONSHIP IN TWO SELECTED GROUPS OF CHILDREN OF AGE 4-7 YEARS**

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The purpose of this study was to experimentally test the effect of pre-school education on the development of thought and personal relationships in two selected groups of children in Sri Lanka and to see if pre-school children were at an advantageous position when they enter Grade I. The first hypothesis was that pre-school education had no significant effect on the cognitive development of children. The second and third hypotheses were that pre-school education had no significant effect on the emotional adjustment and acceptable social behaviour of children. The fourth hypothesis was that pre-school education did not facilitate readiness to formal schooling. The fifth hypothesis was that pre-school children from affluent homes did not differ significantly from children from non-affluent homes with regard to the benefit they get from pre-school education. Pre-post designs were utilized to test these hypotheses and the subjects were administered tests which measured their cognitive development, emotional adjustment, acceptable social behaviour and readiness to formal schooling. 41 subjects formed the experimental group and 55 non-pre-schoolers formed the control group. In addition to the pre-school variable, the home environment of the child was studied in relation to socio-economic status, child rearing practices and parent participation.

There were significant differences between the experimental and control group in relation to cognitive development, acceptable social behaviour, emotional adjustment and readiness to formal schooling, but there were no significant differences between the affluent and poorer groups in relation to the benefits they got from pre-school education.

F-04 **SOME STUDIES INTO THE FEASIBILITIES OF A REHABILITATED COLOMBO-PUTTALAM CANAL**

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**H. A. Abeygunawardana and Disa Weerapana**

A Committee was appointed by government to examine the feasibility in current circumstances of continuing the work of rehabilitating the Colombo-Puttalam canal, in the first instance to enable navigation from Hekitta to Waikkal, and later by extension into the Colombo Beira system and northwards to Puttalam. On the basis of a Netherlands engineering report, steel barges of 25 tonnes carrying capacity were assumed, powered manually or by diesel outward motor. Economic cost comparisons were worked out comparing manual barge, motorised barge, railway and lorry for several commodities with origins close to the canal (viz., bricks, tiles, clay, sand, coconuts, copra, DC, fibre, salt and cement), with differing distances of haul and different relationships of the origins and destinations of the cargoes to the waterside loading and unloading points. Cargoes with waterside origins and/or destinations showed lower cost by barge and so too with railside origin. Where feeder road journeys were necessary at both ends, the lower cost of barge, and rail diminished as the main haul distance decreased. However the findings are very sensitive to many of the assumptions used as to marginal cost components of each mode, especially as regards the impact on cost of the weight loaded on barges and lorries. Moreover, even where costs are clearly lower for water and rail transport, there are many institutional and behavioural reasons why consignors or consignees may prefer to have their goods transported at higher cost by road. Work is continuing to evaluate the benefits to other canal users such as fishermen and tourists, and the non-transport potential benefits, such as drainage, industrial water supply, amenity, etc.

F-05 **VOTERS PREFERENCES OF RULING POLITICAL PARTIES IN SRI LANKA**

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Objective of the study is to find out how voters preferences change with respect to factors such as Cost of Living, Unemployment, Welfare Facilities, etc., in the Colombo District (including Gampaha).

## SECTION F

Period from 1955 to 1970 was considered, the change in proportion of voters preferring Government and the opposition was found in terms of averages of (1) increase in cost of living ; (2) No. of unemployed ; (3) Amount spent on welfare ; (4) No. of days of emergency.

By multi regression analysis, the results of 1977 elections were evaluated and compared with the actual voting figures.

On this basis preferences at the future elections would be worked out taking to account the present conditions.

### MATHEMATICAL MODEL FOR THE GROSS NATIONAL EXPENDITURE OF SRI LANKA

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The purpose of this study was to formulate a Mathematical Model to forecast the Gross National Expenditure at current market prices (GNE).

Testing for a  $k$ th year, the GNE as  $t_k$ , private consumption  $c_k$ , public consumption  $g_k$  and gross domestic capital formation  $i_k$  (with  $t_k = c_k + g_k + i_k$ ), the variables were scaled by dividing with  $t_0$  the value of a base year (taken as 1971) to give  $T_k$ ,  $C_k$ ,  $G_k$  and  $I_k$  respectively.

Following assumptions were made  $C_k = A T_{k-1}$  ;  $I_k = B (G_k - C_{k-1})$

with A, B constants. Relevant data from 1971 to 1979, gave fair constant values for A, B and  $G_k$  was found as a linear function of  $k$ , by means of the least squares method, giving rise to the difference equation.

$$T_k - 2.218 T_{k-1} + 1.35 T_{k-2} = G_k = 0.116 + 0.027k.$$

An analytic technique was used to obtain a solution to the difference equation, in the form

$$T_k = 0.339 k^{1.109} \sin 0.347 (k+11.236) + 0.204k + 1.626.$$

This equation gives an estimate of the GNE for 1980 as Rs. 81,143 million whereas the actual figure is Rs. 83,550 million.

Forecasts of the four items for the decade upto 1990 was made by the use of the computer.

### SOME ASPECTS OF THE WORKING CONDITIONS OF FEMALE WORKERS IN THE TEXTILE INDUSTRY

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This paper highlights the working environmental conditions of female workers employed in the Textile Industries. 423 females belonging to the 20-40 age group work in two fixed work shifts as skilled workers in the industry selected. Most of them perform their work standing for most time of their work shift. Among them 148 (35%) are married. There were 208 child births and 21 miscarriages during the last 10 years. Maternity benefits were made available to those entitled to it. But, those who miscarried did not qualify to receive such benefit. The miscarriages occurred between the 20-29 and the 30-39 age group in the ratio 2 : 1.

The most common type of occupational injury is that caused by flying shuttles injuring parts of the body. There were 18 over—three—day absences from work, for the last two years due to occupational accidents. All the victims were admitted to the Accident Service of the General Hospital at their earliest by the employer. The noise level of the working environment is above 90 dB(A), the permissible level for an eight hour, 5 day week, shift.

F-08 **AN ANALYSIS OF OCCUPATIONAL ACCIDENTS AND OVER-3-DAY ABSENCES  
FROM WORK (1979 - 80) IN SRI LANKA**

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Accidents take a large toll of life and limb and affect men and women to the extent that they are a leading cause of death and disability among workers. In Sri Lanka, accidents which disable workers for more than three days from earning their full wages in premises that are defined as factories are reportable accidents.

This study presents an analysis of 5,700 cases of non-fatal occupational accidents that occurred over a period of two years from January 1979 to December 1980. Among the victims 558 (10%) are females. Majority of the victims were workers within the age group 20-29 years followed by those in the 30-39 age group. The year 1980 records an increase in the percentage of victims in the 20-29 age group for both sexes and for the 30-39 age group for the females compared to the corresponding figures for the year 1979. Industry-wise analysis reveals that the highest incidence of accidents is in the manufacturing industries.

F-09 **CONCEPTUAL VALIDITY OF THE INFORMAL SECTOR**

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Ever since Keith Hart (1973) introduced the idea of the informal sector in his dualistic classification of the urban economy there has been a tremendous response from academics, policy makers and politicians all over the world as regards its relevance in most developing countries. In fact, it has been suggested that the informal sector concept can be used as an instrument of policy for the creation of employment opportunities in the urban economies of these countries which record a high incidence of unemployment of the urban work force.

The idea of the informal sector and its potential for employment creation has gained substantial attention in the Sri Lanka context as well. It is contended that in the city of Colombo the informal sector has been responsible for the easing of the burden of unemployment and that the informal sector comprises an important component of the total employed in the city. It is further suggested that the informal sector is likely to be a key factor in the selection of employment strategies for city development.

However, the very conceptual basis of the informal sector seems to be weak and not amenable to scientific analysis. Further, the inclusion of a wide variety of concerns under the informal sector renders it to be a rather meaningless categorisation.

The objective of this paper is to bring into focus these shortcomings and to explore the possibility of alternative approaches to tackle the problem of urban unemployment in Sri Lanka by injecting a degree of pragmatism which may lead to workable solutions.

F-10 **JOB ENRICHMENT AND INCREASING PRODUCTIVITY IN DEVELOPING COUNTRIES**

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In the highly developed countries in recent years because of the increase in the standard of education of workers, the improvement in the dignity of labour and the demand for greater equality, freedom, autonomy and democratic rights, and because of the expanding aspiration for the satisfaction of social esteem and self-actualization needs after the satisfaction of physical and security needs, there has been a movement towards job enrichment by improving the quality of work through increasing participation, autonomy, flexibility and making the work experience more challenging and creative instead of routine mechanistic.

In the developing countries a major portion of the work done has still not been routinised or mechanised as the majority of workers are still involved in the traditional agriculture, craft and informal sectors but with low productivity. The developing countries need not repeat all the stages and experimental mistakes of the developed countries which pioneered development and can gain from their success and failures by enriching jobs from the beginning through creating challenging job opportunities which would give full expression to the potentialities and talents of workers, with greater participation, autonomy and flexibility. The developing countries like Sri Lanka with its humanistic and spiritual values can even pioneer new ways of enriching the quality of work experience and personal development.

## SECTION F

### F - 11 MAHAWELI SCHEME, DISPLACED PEASANTS AND THEIR PROBLEMS

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In the Mahaweli Scheme by 1983, a total of 1.5 million people are expected to be settled in about 8,000 hamlets. The settlers may be categorised as follows : (a) Those who have come in as settlers, due to the submergence of their lands by reservoir construction ; (b) Those who have become Mahaweli settlers due to inclusion of their purana lands in the settlement area ; (c) Those selected from outside for Mahaweli allotments, an objective criteria being landlessness.

This study attempts to examine how settlers adopted themselves to their new environments and the extent and nature of problems in such adaptations. This was confined to types (a) and (b) above, who constitute the peasants who were displaced from their purana villages by the Mahaweli scheme itself. The Mahaweli new hamlets where settlers were predominantly of type (a) and (b) were chosen and studied in depth by participant observation.

The findings may be summarized as follows : (i) Settlers who had greater economic and social resource in their pre-settlement village than their co-settlers (often from the same village) appear to have utilized this economic and social power base to dominate and streak ahead in the new settlement hamlets ; (ii) A psychological anxiety syndrome particularly among the old residents were the loss of their familiar surroundings, lands, landmarks and landscapes, leading to negative resources and attitudes with consequent inability to 'make good' in the new settlement hamlet ; (iii) The combined consequences of (i) and (ii) is social stratification in the new hamlets, with increasing disparities of income and life styles. Thus inspite of the official Mahaweli ideology and plan to have all settlers in an egalitarian basis with the same size of holdings, etc., the net result appears to make social inequalities more acute than before.

### F - 12 THE EFFECT OF INSTITUTIONAL CREDIT ARRANGEMENTS ON THE INCOME INEQUALITY IN THE PEASANT ECONOMY

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The twin objectives of "rural credit packages" initiated by the state owned commercial banks (People's Bank since 1967 and the Bank of Ceylon since 1973) was to serve as a catalyst to stimulate and promote the potential in the rural areas to increase production and income of peasants and to relieve them of their debt burden. The alleviation of increasing income gap in the rural areas is an important implicit objective of these "packages". Egalitarian "credit packages" with relaxed conditions which were purported to be accessible to an adequate proportion of the peasant community were made to achieve this end. These packages reached an annual average growth rate of 88% in terms of credit disbursement from 1967-1978. It is now opportune to examine the effectiveness of these arrangements.

A comparative study was designed and carried out in two selected villages in the Matale District, using questionnaire survey techniques. The information so gathered was supplemented with published data from available sources.

The analysis reveals that : (a) the benefits derived from these credit schemes have been far below expectation, in terms of the disbursement of credit in the area, usage and recovery. Non-institutional arrangements were found to be predominant ; (b) the operation of the credit scheme itself, has shown an "effect of polarization" of opportunities and resources to an elite group in the community ; (c) the presence of favouritism towards these groups as against the poor segment of the population was apparent in the handling of loan applications, particularly with regard to criteria used to decide eligibility. Furthermore, the adequacy of funds released and the time taken for it, the general supervision and follow ups related to loans were carried out on a preferential basis.

The overall effects of this state of affairs have been (a) the limited accessibility of low income groups of the community to the lucrative institutional arrangements ; (b) the availability of new avenues of income to the elite which in turn widened the income disparities in the peasant community.

The degree and intensity of the operation of these factors were found to vary within the 2 selected villages. This variability was partially due to the presence of factors like the socio-economic conditions of the villages and the inherent operational and supervisory drawbacks of the institutional credit arrangements. The ultimate results of these forces were found to be conducive to causing widening of income differences in the village economy, and was contrary to the objectives for which these arrangements were made.