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CONTENTS.

	PAGE		PAGE
TEACHERS OF ENGLISH: SHOULD THEY BE ENGLISHMEN? By Mr. M. R. PARANJPE, M.A., B.Sc., Poona ...	141	ANATOLE FRANCE. By Mr. V. RAMACHANDRA AYYAR, B.A., L.T., Govt. Training School, Chingleput ...	176
THE TRIUMPH OF ELECTRICITY. By Mr. P. A. NARAYANA AYYAR, M.A., L.T., Lecturer in Chemistry, Govt. College, Kumbakonam ...	143	NUMBER TEACHING BY LIFE AND FOR LIFE. By Mr. S. JAGANNADHAN, Kindergarten Assistant, Teachers' College, Saidapet ...	178
THE POEMS OF THOMAS HARDY—III. By Mr. N. R. HARIHARA IYER, M.A., English Department, University College, Rangoon ...	146	INDIA THROUGH THE AGES — Summary of the Sir William Meyer Endowment Lectures ...	187
DISCONTENT—An Address by Prof. C. R. NARAYANA RAO, M.A., L.T., Central College, Bangalore, at the Third Secondary Educational Conference, Bangalore ...	152	REVIEWS AND NOTICES... ..	188
HOW ONE CAN IMPROVE ONE'S VOCABULARY. By Mr. G. DHARMAROW, M.A., Lecturer in English, Kallikota College, Berhampore (Ganjam) ...	158	A Brief Account of Malayalam Phonetics, by L. V. Ramaswamy Iyer, M.A.; The Journal of the Madras Geographical Association, Vol. II, Nos. 3 & 4; Indian Historical Readers, by James H. Gense, S. J.—Book III.—Romance in Indian History; "Peeps at the League of Nations," by Hebe Spaul.	
THE PLACE OF LITERATURE IN MODERN LIFE—Address delivered by Mr. G. V. SUBBARAMAYYA, M.A., to the Nellore Government Training School Teachers' Association ...	160	THE MADRAS GEOGRAPHICAL ASSOCIATION—Details of the Summer School ...	190
A DOUBTFUL CASE OF MATHEMATICAL RATIONALE. By Mr. U. PUNDALIK SHENOI, B.A., L.T., Asst., Christian High School, Udipi, S. Kanara ...	163	MADRAS UNIVERSITY LIBRARY—LATEST ADDITIONS ...	191
CAUSAL VERBS IN DRAVIDIAN. By Mr. L. V. RAMASWAMI AYYAR, M.A., Maharaja's College, Ernakulam (Cochin) ...	166	LATEST ADDITIONS TO THE CONNEMARA PUBLIC LIBRARY ...	192
MATHEMATICS AND IMAGINATION. By Mr. A. A. KRISHNASWAMI IYENGAR, M.A., L.T., Maharajah's Collegiate High School, Mysore... ..	172	EDITORIALS	193
		A splendid Benefaction; The Inter-University Board, India; Education in the Madras Council; Vernacularisation at the Andhra University; Paid vs. Honorary Vice-Chancellors; The late Mr. G. S. Ramaswami Iyer, B.A.	

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CONTENTS.

1. The Use of Symbols:—The use of symbols as mathematical shorthand. Some additional symbols in common use. The Formula, how derived and used. Exercises; II. Some Fundamental Laws:—Addition and Subtraction. Removal of Brackets. Insertion of Brackets. Multiplication and Division. The Laws of Indices. Order of Operations. Exercises; III. Symbolic Solution of Problems:—The extended application of the Formula. The Laws of Equality. Reversibility of Steps. Verifying the correctness of result by substitution. The Solution of Problems by means of equations derived from them. Exercises; IV. Graphical Representation:—Variables and Constants. Dependence of one variable upon another. Graphical Representation. Representation of values by marking points. The Graph. Readings from the Graph. Limitations of the Graph. A few points to be observed in graphical representation. Magnifying portions of a Graph. Exercises; V. Directed Numbers:—Directed numbers, their meaning and diagrammatic representation. Extended application of Directed Numbers. The New Number-Scale and its Study. The Four Fundamental operations applied to Directed Numbers—Addition, Subtraction. The Laws of Addition and Subtraction. Multiplication, Division. Some Laws of Multiplication and Division. Application of the Laws of Equality to operations involving Directed Numbers. Algebraic Form. Exercises; VI. Algebraic Expressions and a few Elementary processes:—Distinguishing expressions from the number of terms. Distinguishing expressions by means of their degrees. Exercises. Addition and Subtraction by Polynomials. Brackets. Exercises. Long Multiplication. Exercises. Long Division. Exercises; VII. Special Products. VIII. Factors and Multiples:—The Use of Factors. Factorising expressions of the form $Nx + Ny + Nz$. Exercises. Factorising by convenient grouping of terms. Exercises. Factorising expressions of the type $x^2 + 2xy + y^2$ and $x^2 - 2xy + y^2$. Exercises. Factorising expressions of the type $x^2 + px + q$. Exercises. Alternate method of factorising $x^2 + px + q$. Exercises. Factorising expressions of the type $Ax^2 + Bx + C$. Exercises. Highest Common Factor. Exercises. Least Common Multiple. Exercises; IX. Fractions:—The Algebraic Fraction. The Principle of Equivalent Fractions. Application of the above principle—Reducing a fraction to its lowest terms. Exercises. The sign of a fraction and the signs of its terms. Exercises. Expressing fractions with a common denominator. Addition and Subtraction of Fractions. Exercises. Multiplication of Fractions. Division of Fractions. Simplification of Fractions. Complex Fractions. A Continued Fraction. Exercises; X. Graphs:—Function of a Variable. Plotting. Exercises. The Straight Line Graph. Reading from the Graph. Study of Variation from the Graph. Graph as a Reckoner. Graph as a Locus. Choice of Scales to be adopted. Exercises. Graphical Interpretation of the Constants m and c in the Linear Relation $y = mx + c$. Graphical method of determining the Constants in a Linear Law. Exercises. Locus Graphs. The Shape of the Graph. Symmetric Properties. Study of Variation from the Graph. Graph as a Ready-Reckoner. Note on the Choice of Scale. Graph as a Locus. Exercises. Geometric applications; XI. Simultaneous Equations and their Applications:—Notion of an Indeterminate Solution. Notion of Simultaneous Equations. Handy methods of solving simple simultaneous equations in two unknowns. Exercises. Applications. Exercises. Determining Constants in a Linear Law. Exercises. Problem—Solution by means of Simultaneous Equations. Exercises. Simple Simultaneous Equations in three unknowns. Exercises; XII. Quadratic Equations and Problems:—A Quadratic Function. A Quadratic Equation. Solution of Quadratic Equations. Exercises. Applications. Exercises. Evaluation from Formulae. Problems. Geometric Applications. Appendix A. Special Developments:—(a) Functional Notation; (b) The Method of Detached Co-efficients; (c) Homogeneity and Symmetry in Functions; (d) The Remainder Theorem and its Corollaries; (e) Applications of the Principle of Undetermined Co-efficients; (f) Factors; (g) Identities; (h) Square Root; (i) Equation—Solution. Appendix B. Extra Examples. Answers. Madras S. S. L. C. Examination Question Papers.

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Elementary Mathematics, Part I இன் மொழி பெயர்ப்பு.

மொழி பெயர்ப்பாசிரியர்:

சேலம் முனிசிபல் காலேஜ் கணித போதகாசிரியர், S. சிவராமன், B.A., L.T.
சைதாப்பேட்டை டிசர்ஸ் காலேஜ் கணிதபோதகாசிரியர் S. பாலகிருஷ்ண அய்யர், B.A., L.T.,
அவர்களுடைய முன்னுரையுடன் கூடியது.

(முதல் பாகம்.)

பொருளடக்கம்.

I. எண் மானம் என் குறிப்பும்:—எண்கள்; இலக்கங்களால் எண்களைக் குறித்தல்; எண்களின் சுய மதிப்பும் ஸ்தான மதிப்பும்; ரோமன் வழி. II. கோடுகளும் புள்ளிகளும் நீள அளவையும்:—கீழ்ப்; ஸர் பெஸ்கன்; கோடுகள்; புள்ளிகள்; கோடுகளின் வகைகளும் நேர்கோடுகளைப் பரீட்சிக்கும் விதமும்; புள்ளிகள் குறித்தலும் கோடுகள் இழுத்தலும்; நீள அளவு; டிவைடர்களின் உபயோகம்; எண்களை நீளத்தால் குறித்தல். III. கூட்டல்:—கூட்டலின் அர்த்தமும் உபயோகமும்; கூட்டலைப்பற்றிய ஓர் உண்மை; கூட்டல் படத்தால் காண்பித்தல்; அடைப்புக் குறிகள்; கூட்டல்; பெரிய கணக்குகள்; கழித்தல்; கழித்தலைப் படத்தால் காட்டுதல்; பலவகை கழித்தல் வழிகள்; கூட்டல் கழித்தலைப்பற்றின சில விதிகள்; கலப்புக் கூட்டலும் கழித்தலும். IV. பெருக்கல்:—பெருக்கலைப் படத்தால் காண்பித்தல்; ஒரு ஸ்தான எண்ணால் பெருக்கல்; பாக்டர் களால் பெருக்கல்; எந்த எண்களைக் கொண்டும் பெருக்கல்; பெருக்கலில் குறுக்கு வழிகள். V. வகுத்தல்:—வகுத்தலைப் படத்தில் காட்டுதல்; ஒரு ஸ்தானத்தால் வகுத்தல்; பாக்டர்களால் வகுத்தல்; 10, 100 முதலிய வகைகளால் வகுத்தல்; நீள வகுத்தல்; வகுத்தலின் இன்னொரு அர்த்தம்; சில பெருக்கல் வகுத்தல் விதிகள்; பெருக்கல் வகுத்தலில் சில குறுக்கு வழிகள்; ஒன்பதுகளை நீக்குதல். VI. பலவின் வெண்கள்:—அளவை வாய்ப்பாடுகள்: மாணய அளவுகள்; கிறை அளவுகள்; நீள அளவு; பிடித்தல் அளவு; கால அளவு; காதித அளவு; எண்ணிக்கை அளவு; இனமாற்றத்தல்; பலவின் வெண் கூட்டல்; கழித்தல்; பலவின்வெண் பெருக்கல்; பலவின் வெண் வகுத்தல். VII. கோணங்களும் அவற்றின் அளவும்:—திசை, திசைமாற்றம்; கோணம், கோணங்களை ஒப்பிட்டுப் பார்த்தல்; நேர்கோணம்; சதுரங்களும் ரெக்டாங்கிள்களும்; வட்டங்கள்; கோணங்களின் அளவு; கோணங்களின் வகைகள்; ப்ரொட்டாக்டரைக் கொண்டு கோணங்களை வரைதல்; ஒரு புள்ளியிடத்தில் உண் கோணங்கள். VIII. டெஸிமல்கள்:—டெஸிமல்களின் அர்த்தம்; டெஸிமல் குறிப்பில் ஸ்தான மதிப்பு; இரண்டாவது டெஸிமல் ஸ்தானம்; டெஸிமல் குறிப்பு பொது விவரம்; ஒரு டெஸிமல் ஸ்தானமுள்ள எண்கள்; டெஸிமல் கூட்டல்; டெஸிமல் கழித்தல்; எந்த எண்களையும் கழித்தல்; 10, 100 முதலியவகைகளால் பெருக்கல்; ஒரு ஸ்தானமுள்ள முழு எண்ணால் பெருக்கல்; ஒரு ஸ்தானமுள்ள முழு எண்ணால் வகுத்தல்; பல ஸ்தான முழு எண்களால் பெருக்கல்; பல ஸ்தான முழு எண்களால் வகுத்தல். IX. உயர்ந்த பொது அளவும் தாழ்ந்த பொது மடங்கும்:—அளவும் மடங்கும்; பொது அளவும் மடங்கும்; உயர்ந்த பொது அளவும் தாழ்ந்த பொது மடங்கும்; பாக்டர்களால் இரண்டு அல்லது இரண்டிற்கு மேற்பட்ட எண்களின் உ. பொ. அ. உம், தா. பொ. ம. உம் கண்டுபிடிக்கும் வழி; உ. பொ. அளவைக் கண்டுபிடிக்கும் பொது வழியைப் படத்தாற் காட்டல்; உ. பொ. அ. பொது வழி. X. சாதாரண பின்னங்கள்:—பலவின் அளவுகளின் பின்னங்கள்; ஒரு கான்கிரீட் அளவை இன்னொரு கான்கிரீட் அளவின் பின்னமாகச் சொல்லுதல்; சமமான பின்னங்கள்; சமமான பின்னங்களைப் படத்தாற் காட்டுதல்; பின்னங்களின் சமத்துவம்; தாழ்ந்த

உறப்புகள்; பின்னங்களை ஒப்பிடுதல்; பின்னங்களின் கூட்டலும் கழித்தலும்; ஒரு சாதாரண பின்னத்தை ஒரு முழு எண்ணால் பெருக்கல்; சாதாரண பின்னத்தை ஒரு முழு எண்ணால் வகுத்தல்; ஒரு பின்னத்தை பெருக்கல்; பின்னத்தின் பின்னம்; ஒரு பின்னத்தால் வகுத்தல்; ஒரு எண்ணை ஒரு குறிப்பிட்ட டிஸிமிலேட் உள்வாங்கி மாற்றல்; பின்னங்களைச் சுருக்கல். IX. வாடிக்கை முறை:—பலமாதிரிக் கணக்குகள் பரீட்சைக் கேள்விகள். விடைகள்.

முதல் பாகம் 5-வது வகுப்புக்கும் 1-வது பாரத்திற்கும், கிரௌன் 300 பக்கங்கள், விலை அணு 12

Approved as a Text-Book suitable for School use,
vide Fort St. George Gazette, Part I-B, p. 546, dated 1-11-27.

(இரண்டாம் பாகம்.)

பொருளடக்கம்.

பரீட்சைக் கேள்விகள். I. டெஸிமல்களின் பெருக்கலும் வகுத்தலும்: ஒரு ஸ்தான டெஸிமல் எண்ணால் பெருக்கல்; சமமான பரிசோதனை; எந்த டெஸிமல் எண்ணாலும் பெருக்கல்; டெஸிமல்களால் வகுத்தல்; சமராய்ச் சொல்லல்; சாதாரண பின்னங்களை டெஸிமல்களாக மாற்றல்; டெஸிமல்களை சாதாரண பின்னங்களாக மாற்றல். II. சராசரி, தேதியோ முதலானவை: சராசரி; தேதியோ; மாறாத தேதியோ தேதியோவின் உபயோகங்கள்; ப்ரோபோஷன்; லாப லப்தம்; வருமான வரி; கடன் மிகுதல். III. பரபளவு: பரப்பளவு; ரெக்டாங்கிள்; இங்கிலிஷ் பரப்பளவுகளும் ப்ரொஞ்சு பரப்பளவுகளும்; பரப்பளவு வரம்பாடுகள்; பிளான் வரைதல், அதாவது அமைப்புருவம் வரைதல்; தரையின் பரப்பளவும் நாய்களின் பரப்பளவும்; கட்டக் காகிதத்தின் உபயோகம். IV. பொது எண் கணக்கு சமிகாணங்கள்: அங்க கணித முயற்சி கணிதமும்; சில பெயர் விளக்கங்கள்; சமிகாணங்கள்; இன அங்கங்கள்; அடைப்புக் குறிகள் கீக்குதல். V. முக்கோணங்கள்: அவற்றின் பக்கங்களும் கோணங்களும்: முக்கோண விரிப்பு; முக்கோணங்களின் கோணங்கள் பக்கங்களுக்குள்ள சம்பந்தங்கள்; ஒரு புள்ளியிலிருந்து சிபந்தனைக்கிணங்க மற்றொரு புள்ளி குறித்தல்; இரண்டு புள்ளிகளிலிருந்து சிபந்தனைகளுக்குக் கிணங்க மற்றொரு புள்ளி குறித்தல்; கொடுக்கப்பட்ட அளவுகளைக் கொண்டு முக்கோணம் வரைதல்; வட்டங்களின் சில தன்மைகள்; முக்கோணங்களின் வகைகள்; புள்ளியிலிருந்து ஓர் கோட்டிற்கு பெர்பெண்டிகுலர். VI. கோடுகளையும் கோணங்களையும் இருசமபாகங்களாகக்: இருசம பக்க முக்கோணங்களின் சில தன்மைகள்; நேர்கோடுகளை இருசம பாகங்களாகக்குதல் கோணங்களை இருசம பாகங்களாகக்குதல்; கார்ட்களையும் வட்ட பாகங்களையும் இரண்டு சம பாகங்களாகக்குதல் பெர்பெண்டிகுலர்கள் இழுத்தல்; ஸ்மிமெட்ரி. பலமாதிரிக் கணக்குகள்; முதல் பாரப் பாடங்களில் புதிதான கணக்குகள்:—கூட்டல் கழித்தல்; பெருக்கல்; வகுத்தல்; பலவின் எண்கள்; கோணங்களும் வட்டங்களும் டெஸிமல்கள்; உயர்ந்தபொது அளவும்; தாழ்ந்த பொது மடங்கும்; சாதாரண பின்னங்கள்; பலமாதிரி இரண்டாம் பாரப்பாடங்களில் பலமாதிரிக் கணக்குகள். பரீட்சைக் கேள்விகள். அறுபத்தாம். விடைகள்.

இரண்டாம் பாகம் 2-வது பாரத்திற்கு, கிரௌன் 208 பக்கங்கள். விலை அணு 11

Just Ready.

(மூன்றாம் பாகம்)

பொருளடக்கம்.

பரீட்சைக் கேள்விகள்; அத்தியாயம் I. நூற்றுக்குக் கணக்கிடலும் அதன் பிரயோகமும்; II. ருண எண்களும் பீஜ சமிகைச் சேர்க்கைகளும்; III. சமநீராக் கோடுகளை அவற்றின் தன்மைகளும்; IV. படக் குறிப்புகள்; V. ப்ரோபோஷன்—நோனதும் மாறாதும்; VI. முக்கோணங்களின் சர்வ சமத்துவம்; VII. முக்கோணங்கள், சமநீராக் நாய்களும், வட்டங்கள் இவற்றின் பரப்புகள்; VIII. பருமன் அல்லது கன அளவு; IX. தர சமிகாணங்களும் அவற்றிற்குக் கொண்டுவீடும் யோசனைக் கணக்குகளும்; X. பலவகை கணக்குகள்; பரீட்சைக் கேள்விகள்; பலமாதிரிக் கணக்குகள்; விடைகள்; பலவ அளவு வாய்ப்பாடுகள். Cr. 8vo. 300 pages. விலை அணு 12.

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TEACHERS OF ENGLISH :
SHOULD THEY BE ENGLISHMEN ?

By

Mr. M. R. PARANJPE, M.A., B.Sc.,
Poona.

IN the November number of the *Educational Review* appears a short editorial note rightly criticising the opinion expressed by the *Mysore University Magazine* that the proper men to teach English are Englishmen. The opinion expressed by the *Mysore* journal looks so self-evident that people often accept it without question and but for the practical impossibility of the step school-managers would like to entrust the English-teaching in their schools to real live Englishmen. The problem however is very ably discussed in "Modern Studies," the report of the Committee appointed by the Prime Minister in 1916 to consider the position of Modern Languages in the educational system

of Great Britain, and the following extracts from this report will surely be read with interest in this connection:—

"Not only is it more difficult for foreigners to exercise an easy and salutary influence over their pupils, but it is natural to suppose that the studies themselves will be more successfully presented to the classes by teachers who approach them from the British point of view. A foreign assistant is a most valuable supplement in a school where sufficient provision is otherwise made for the necessary class work and superior control. The foreigner can best be used, under direction, for setting before beginners a model of pronunciation and intonation, for conversational classes with the more advanced pupils, and for the correction and criticism of advanced composition—at all events of free composition, since translation into a foreign language requires accurate knowledge of the mother-

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tongue—leaving the regular routine of the classes and the direction of modern studies throughout the school in the hands of qualified British teachers. In registering this conclusion, we rely not on British evidence alone, but also on the opinions expressed by several of our foreign witnesses.

"In our opinion Modern Studies in our Universities have suffered greatly in the past through the absence of British control and direction. The excessive philological and antiquarian bias which has so long prevailed in Modern Studies at our Universities can be directly traced to foreign influence..... Modern Studies can never be at home in Britain until they are directed in a comprehensive spirit in conformity with the national needs, the national traditions of education, and the national character. This can only be done by British scholars.

"Further there has been no sufficient motive to persuade a foreign scholar, whose foot was on the ladder, to quit his country for an alien and uncongenial atmosphere. With notable exceptions the results have been as might be expected; too often we have not got the best. Moreover it might be doubted whether even the best could thrive under the conditions that are inevitable..... In certain parts of the teaching, especially where translation into English or from English is concerned, the foreigner has manifest disabilities, and scholarship has undoubtedly suffered thereby. Again as time goes on, the foreigner loses his initial advantages. It is unlikely that he will preserve his pronunciation and intonation unimpaired among British surroundings. As the times alter, he will lose that intimate knowledge of the spirit and circumstances of his native country which he

once possessed. The more he becomes a Briton, the better in one way; the worse in others. It may be that after the lapse of years he has all the drawbacks of an alien and none of the esoteric knowledge of the native.

"We are not of course suggesting that foreigners should have no place in the Modern Studies of our Universities. Until Spanish, Italian, Russian studies have been fairly established in this island, we may have to rely to some extent on help from abroad, and we should be grateful to those who are willing to come to our aid. But this policy should be regarded as a temporary makeshift; and we should not be satisfied until the head of every department of Modern Studies in every University is a thoroughly qualified native of the realm. If this be established in principle and in fact there may still be room for the exceptional appointment of a foreigner of distinction as professor or lecturer in some special branch of Modern Study. Again even if all the important posts in all the Universities and in the Modern Studies belonging to all the chief European countries, were held by Britons, there should still be attached to each language one or more indigenous assistants to give that help in the study of pure language which no Briton can properly supply. But these foreign assistants should be young men or women engaged for a term of two or at most three years and changed at the end of the fixed period. If the employment of foreigners on this basis becomes a recognised and universal practice in our Universities, we may be able to establish reciprocity with the chief friendly countries of Europe and thus have constantly abroad a number of young men and women earning a livelihood and at the same time pursuing their own

studies and acquiring by prolonged residence that intimate familiarity with the country which cannot be gained in any other way, and which is essential if they are to be properly equipped to fill teaching posts of various grades at home.

"If we look at the question from the other side, we shall see that Modern Studies can never offer to young Britons an attractive career until there are many and important positions which they can hope to win by merit, and for which British birth is regarded as a qualification and not as a defect. There should be many more such positions and a greater variety of them; but we must repeat that they should not be hastily filled by foreigners or by relatively incompetent natives of this country. Time should be allowed for the training of candidates of high ability and indubitable claims. Finally if the ambition of young students is to be stimulated in the fullest degree for the public benefit, other openings are needed for scholars, as for instance in the service of the Foreign Office, in the Diplomatic and in the Consular service, and in commerce and the commercial side of industry. Here, however, we are principally concerned with the prospects in the teaching profession. But in this as in all other professions, the improvement of salary, status, consideration, and prospects is the chief means by which a sufficient proportion of the highest talent can be attracted to Modern Studies."

In the above extract, one has only to write 'English' for 'Modern Studies,' 'India' for 'Britain,' 'Indian' for 'British' and read it again to be convinced that the opinion of the *Mysore University Magazine* is fallacious and therefore mistaken.

THE TRIUMPH OF ELECTRICITY

By

Mr. P. A. NARAYANA AIYAR, M.A., L.T.,
*Lecturer in Chemistry, Govt. College,
Kumbakonam.*

ASTONISHING achievements in the application of electricity to human comforts and conveniences have marked the beginning of the 20th century and the strides of progress during the last 25 years are wonderfully striking. Electricity has become to-day the nimble servant of mankind and if we should be without it, we would be back again to dark ages. In addition to the vast industries employing electricity, a veritable revolution has taken place in the several departments of house-keeping and business-concerns.

In one of the shops dealing with electrical ware is found the advertisement "Light, Heat and Help 'on Tap.' Electricity lightens labour and lengthens leisure." This indicates briefly the use made of electricity in the home. First as regards lighting: How many of our houses are still lit with smoky flames? And how many of our conservative elders still dread at the religious sacrilege of an electric light at an altar. This reminds me of the story of the Scotch farmer who stayed in London one night and complained to his friends on his return that he could not sleep a wink in the hotel because there was a lamp blazing all night over his bed. When asked why he did not blow it out, he said he could not, as it was a red hot hair pin shut up in a glass bottle.

Of course these unhappy days are fast disappearing in places where current is cheaply available and even in electric lighting, marked progress has recently been made.

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Twenty-five years ago, the two electric illuminants were the carbon-filament and the arc lamp. The former gave reddish yellow light very different from day-light and the latter required fresh carbon rods every day or two. All this has been altered by the gas filled tungsten glow lamp. Tungsten is a metal which is very infusible and can be drawn into wire as fine as a human hair. A loop of the wire, mounted in a glass bulb which is exhausted of its air, is the present domestic vacuum electric lamp. If the bulb is filled with the rays of gas argon, it gives a red light.

We cannot pass over the subject of lighting without making mention of the mercury vapour lamp. In it an electric current is sent through mercury vapour in a long exhausted glass or silica tube. It gives a light rich in ultra violet rays and is very efficient for photography. It finds certain important medical uses too.

Now as regards heat, electricity is the house-wife without any untidiness usually attached to her. Twenty-five years of research has placed in the market a robust electric cooker with its operations almost automatic. It can be placed anywhere in the lightest and brightest corner of the room. The cooked food is perfectly clean and highly nutritious owing to the rapid sealing of the outer surface by the radiant electric heat. It will cook by a clock. No dirt, no ashes, no dust, no flues to clean, and a cool kitchen even on a hot summer day. Another item is the hot cupboard for keeping plates, dishes, etc., quite warm.

Electricity is now the principal means of labour-saving in the realm of domesticity. Every sort of work in the house is done easily, quickly and efficiently. The chief

assistant in cleaning the house is the suction-cleaner. Dust is the enemy of man and should not be allowed to settle on the floor or furniture. The vacuum cleaner does it best.

In the scullery, even greater boons are available. The electric clothes-washer is perfectly automatic, a drying cabinet is a real treasure in damp weather, and an electric hand-iron should considerably reduce the cost of laundry charges and incidentally the inevitable worries of the washerman. In the bed room, 'the Catburglar' alarm is one of the latest innovations and the electric fan is too well-known to need mention. The new Sun-ray light heater works its way with the touch of a switch, enveloping you with warm air like a cosy blanket.

Mention must be made of electric refrigerators which can be made to start and stop automatically, so that one has always a cold chamber in which to keep food or prepare ice as he likes. The sewing machine which is a domestic outfit can be driven by a small electric motor or the garage may have its own workshop fitted with an automatic battery charger, tyre pumps, motor-driven lathe and a hand vacuum-cleaner for reaching inaccessible places inside the car. These are only a selection of the infinite variety of tasks which this nimble servant can be made to perform.

In the business world are two astounding and remarkable achievements, that I am afraid, without them, business will be at a stand-still—I refer to telephony and telegraphy. It is no exaggeration to say that a business man, by their use, can get through twice as much work as was possible without it. The use of the telephone at home in case of fire, burglary or accidents, will bring help with the least possible delay. Telephony

has effected a revolution in our railways. From the moment a train leaves the station, its movements and the time it is keeping are followed and reported by telephones to a central control office which in turn passes on the information to those whose business it is to see that it arrives safely at its destination. To the editor, the telephone is invaluable. All false news could be eliminated and facts verified with the minimum of delay. In a word, the telephone has annihilated distance and introduced new time values into modern life. Several improvements have been effected in the system and a recent one is the automatic telephone by which manual labour is minimised. The subscriber can be sure of the right connection if he is careful himself. The latest innovation is the wireless telephony in which a line is loaded by inserting at certain distances induction coils or thermionic repeaters to keep the electric wave in the same form as it was at its origination. It is possible thereby to get into conversation with foreign countries.

Then, with regard to telegraphy: The old Morse system by which signals in the form of dots and dashes were transmitted at the rate of about twenty-five words a minute proved incapable of coping with the volume of messages and necessity required further improvement. The latest is however the wireless. The possibility of electric waves travelling through space was first conceived by Prof. Maxwell. It was explored by Hertz in 1888 and in 1895, Marconi, then aged only twenty-one, conceived the idea of using these Hertzian waves for the purpose of telegraphy and in 1899 the wireless messages were transmitted through short distances. When the question of long distance communication came, people were very sceptical of the possi-

bility of the waves bending around the curvature of the earth sufficiently. But Marconi was an experimental scientist rather than a theorist. He actually tried the experiment on a large scale, between England and Nova Scotia and the result was a Trans-Atlantic service.* Since then, several improvements have been made to get a large amount of energy into the aerial. But no achievement of wireless makes such an intimate appeal to the public as the development of radio-telephonic broad-casting to disseminate news, instruction and entertainment. One cannot but marvel at the advances made towards the ideal of a perfect reproduction of speech and music.

It remains now to refer briefly to the great advances made in electric traction. The G.I.P. Railway has already electrified a part of its line and proposals are in the air to electrify railways in the suburbs of Madras when the Pykara scheme fructifies. It is a pity that we do not utilise to the full the water power resources of the country.

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THE POEMS OF THOMAS HARDY—III.

By Mr. N. R. HARIHARA IYER, M.A.,
English Department, University College, Rangoon.

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POEMS OF WAR AND PATRIOTISM.

HARDY'S prefaces to his books are always interesting and, in those of the *Trumpet-Major* and the *Dynasts*, he describes the sources of inspiration of many of his plots and themes in the episodes of war. As a boy, he heard any number of stories of wars from his mother and from others. In the *Melancholy Hussar* of the German Legion in *Life's Little Ironies* he narrates how, as a lad of fifteen, he heard the romantic account of Phyllis Grove and Matthäus Tina from the former when she was seventy-five: he attempts to do justice to her memory by a faithful relation of the old lady's experience as he had it from her. As Hardy says in this little story: "Soldiers were monumental objects then. A divinity still hedged kings here and there; and war was considered a glorious thing." And in the *Return of the Native*, Grandfer Cattle, on the occasion of the wedding of Venn and Thomasin (Mrs. Wildere), goes back with humorous bravado to the days of his soldiering and speaks words of grave wisdom to his death friends. "In common conscience every man ought either to marry or go for a soldier. 'Tis a scandal to the nation to do neither one nor t' other. I did both, thank God! Neither to raise men nor to lay 'em low—that shows poor do-nothing spirit indeed."

In the volume of *Wessex Poems* are a few episodes of a reminiscent character. 'The Alarm' recalls the memory of a member of the poet's family looking for 'Signs Divine' before going to battle. 'Leipzig' falls from

the lips of old Norbert—said to be a German—at the ship's inn. 'The Peasant's Confession' illustrating the far-reaching results of acts of negligible individuals on the fortunes of nations is the story of the peasant who 'led treacherously', the messenger from Napoleon who inquired if Grouchy marched by the peasant's farm. Nearing death the peasant repents:

"O Saints, had I but lost my earing corn
And saved the cause once prized!
O Saints, why such false witness had I borne
When late I'd sympathised!
So now, being old, my children eye askance
My slowly dwindling store,
And crave my mite; till, worn with tarriance,
I care for life no more."

One of these old memories is the light-hearted song of the Sergeant so merry in the face of the peril that threatens South England across the Channel. One stanza may be quoted:

"When Lawyers strive to heal a breach,
And Parsons practise what they preach;
Then Boney he'll come pouncing down,
And march his men on London town!
Rollicum-rorum, tol-lol-lorum,
Rollicum-rorum, tol-lol-lay!"

The brooding imagination of the poet, moved by memories and songs of battles long ago, has given most realistic pictures of the horrors of war in the *Dynasts*, in the sufferings of all, high and low, from worms on the ground to kings and queens in their palaces. In his own life-time he witnessed two big wars—the Boer War of 1899 and the Great War of 1914. When he sees the destruction of good feelings and good relations between nations, civilised and Christian, in spite of advances made in science and thought, the ironist in him mingles with the philosopher to

justify even extreme pessimism. But he is all admiration for the heroism, valour and achievements of soldiers who by unselfish fight glorify the cause. The fortunes of wars alter the lives of men which take unnatural courses thereafter. Fathers lose sons in the prime of life. Wives are left without their dears. Burials remote from the ancestral homes and under strange skies, and accidents that unjustly destroy the last hopes of a helpless widow touch the tender chord in the poet, and the war-poems move the tenderness in the mind of the common man seeking simple satisfactions in life. Kinship is divided from savage enmity by narrow boundaries, and men, who are friends otherwise, fly at each other's throats goaded by war.

Southampton in 1899, a naval station wherefrom soldiers embarked for South Africa, rouses the vision of old armies landing in that very place, of Vespasian, and Cedric with his Saxons. The soldiers

"Yellow as autumn leaves, *alive as spring*"
are seen off by their sisters, parents, and wives. Their heroism and confident marching strike the onlooker.

"None dubious of the cause, none murmuring."
Yet beneath the appearances flow thoughts of grief.

"Wives, sisters, parents, wave their hands and smile,

As if they knew not that they weep the while."

In the midst of conflicting hopes and fears, the wives who, in the going of the battery, march with their husbands to the port still trust.

"Though may be hard their ways, some Hand will guard their ways,

Bear them through safely, in brief time or long."

And, on the return of the soldiers, the joy of the sweethearts finds appropriate expression in the cheerful welcome in the song of the soldiers' wives and sweethearts.

"Now all the town shall ring to them,
Shall ring to them,
And we who love them cling to them
And clasp them joyfully;
And cry, "O much we'll do for you
Anew for you,

Dear Loves!—age, draw and hew for you,
Come back from oversea."

And they are impatient in their eager expectation.

"Dawn, hold not long the day from us,
But quicken it to prime!"

The sight of the lists of the wounded and killed at the War Office in London leads to a contrast of the modes of death of last year and then. While Death was nature's due just a year previous, 'sheets of scheduled slaughter' are now issued every hour. Poor drummer Hodge from remote Wessex, who knew so little of South Africa, her Karoo and her Bush, lies buried in a strange land and in his death he is one with the unknown.

"His homely Northern breast and brain
Grow to some Southern tree,
And strange-eyed constellations reign
His stars eternally."

In his moods of meditative looking back and ahead, Hardy has given a characteristic weird poem in 'The Souls of the Slain.' As he sat in the silence and darkness of the night by the sea,

"A dim-discerned train,
Of sprites without mould"

flew homeward from the south.

They are met by their general's spirit.

"And he met them and spake "Is it you,
O my men?" Said they, "Aye! we bear
homeward and hearthward
To feast on our fare."

He tells them the tales of their homes as
he visited them before they came. Their
mothers talk of their boyish doings more than
of their war exploits and pray they had more
faith before death. Their fathers regret the
boys had not been trained in peaceful occu-
pations and wish they had not told them
stories of heroes. Some sweethearts mourn
their beloved even now, while the fickle ones
have chosen new lovers. The wives talk of
and dwell on their 'deeds of home,' 'deeds
of fondness or fret.' The discovery of the
oblivion that has overtaken their much vaunt-
ed fame in war disconcerts many of these.
But in general there was a consoling reflection.

"Fame we prized till to-day;
Yet that hearts keep us green for old kindness
we prize now
A thousand times more."

The spirits flew apart leaving the poet to
his musings that the only solace in life was in
our being remembered for some time by those
we leave behind. Life and Love claim more
from the heart than the glories of war as the
poet again makes us feel in the poem.

In time of "The Breaking of Nations,"
Gladly the poet turns from these grim sights
of woe which are the legacy of war to welcome
the death of the old Battle-god who in
darker times readily 'sped each mortal jar' in
many lands. Modern thought, the dire crimes
of history and 'the pleadings' of seers have
spread new ideas towards a happy change.

"Yea, seeds of crescent sympathy
Were sown by those more excellent than he,
Long known, though long condemned till then
The gods of men in amity."

* * *

Let men rejoice, let men deplore,
The lurid Deity of heretofore
Succumbs to one of saner nod:
The Battle-god is god no more."

The poems on the Boer War were issued
in 1901 in the volume Past and Present
Poems. The next six years saw the writing
of the Dynasts published in three parts. The
concluding lines of the chorus of the Pities
embody the hope

"That the rages
Of the ages
Shall be cancelled, and deliverance offered
from the darts that were,
Consciousness the will in forming, till it
fashion all things fair!"

and the message of hope was a relief.

However, in 1914, on the outbreak of the
World War with all its ugly and inhuman
brutality, the Battle-god shone lurid with a
vengeance, not over Europe only as in the
wars of the Dynasts but over the wide world.
The poet saw the bottom of his hope knocked
off. The poems of war and patriotism evoked
by the war of 1914 are included in Moments
of Vision published in 1917. One of the
noblest—Men who march away—a song of
the soldiers was written in 1914. The poet
echoes the fervent readiness of the soldier
who sees what he is about. He is not weak
of eye, No, nor of heart.

"Nay. We well see what we are doing,
Though some may not see—
Dalliers as they be—
England's need are we;
Her distress would leave us rueing;
Nay, we well see what we are doing,
Though some may not see."

In our heart of hearts believing
Victory crowns the just,
And that braggarts must

Surely bite the dust,
Press we to the field ungrieving
In our heart of hearts believing
Victory crowns the just."

There is the same exalted inspiration in
the mood as in Swinburne's 'A Marching
Song.'

So, in 'A Call to National Service,' the poet
appeals to the heart of the people for the
defence of the realm. Let no false issue cloud
the spirit or blur the vision.

"—Say, then, "I come!" and go, O women and men
Of palace, ploughshare, easel, counter, pen;
That scareless, scathless, England still may stand."

Hardy was seventy-seven when the call to
the people sounded.

"Would years but let me stir as once I stirred
At many a dawn to take the forward track,
And with a stride plunged on to enterprise,
I now would speed like yester wind that
whirled
Through yielding pines; and serve with never
a slack,
So loud for promptness all around outeries."

The soldiers' poet could not have touched
the nation's heart more inspiringly. And he
has no sympathy for the weak sentimentalist
who whines when he ought to make the
utmost sacrifice in strenuous efforts which are
the need of the hour, as is evident in 'In Time
of Wars and Tumults.' He is very practical.

Familiar with words common in Wessex
corners recalling kinship with Germany and
appreciating the bonds of intellectual unity
between England and Germany through the
ages, the poet feels with pain that Germany's
cry 'O England, may God punish thee' only
brings disgrace upon the name and fame of
Teutonic genius. The hymn of hate ill
becomes the land whose

"Fair Rhine-stream, and its storied towers"

XXXIV—20

were so loved by Englishmen.

"—Is it that Teuton genius flowers
Only to breathe malignity
Upon its friend of earlier hours?"

The distress of the Belgians inspires the
poems 'An Appeal to America,' 'On the Belgian
Expatriation' and 'The Cry of the Homeless.'
Dreaming of the bells from the land of chimes
being hoisted in English churches,

"* * * That the musical rhymes
Rung by them into space at meted times
Amid the market's daily stir and stress,
And the night's empty star-lit silentness
Might solace souls of this and kindred climes,"

the poet wakes to find the refugees driven out
of their land and homes with 'no carillon in
their train.'

"Foes of mad mood
Had shattered these to shreds amid the gear
Of ravaged roof, and smouldering gable-end."

And in 'The Cry of the Homeless,' the
charity and compassion so deep in Hardy—
to which tributes are being offered daily now
—return the conqueror's mood not with a
corresponding hymn of hate.

"Nay: a richer malediction!—
Rather let this thing befall
In time's hurling and unfurling
On the night when comes thy call;
That compassion dew thy pillow
And bedrench thy senses all

For thy victims,
Till death dark thee with his pall."

In earlier wars there was honour and
knightly greatness. True heroism knew no
practices of perfidy. Bearing in mind the
sinking of the Lusitania and other atrocities,
we can share the poet's concern at the fall
from the noble chivalry of

"End we quick or dead
Honour is some reward!

Let us fight fair—for our own best or worst;"

to the fashion and code

"Sly slaughter

Shall rule! Let us, by modes once called accurst,
Overhead, under water,
Stab first."

That war has no natural place in the lives of men is brought home to us in the sonnet "Often When Warring" and the poem "The Man He Killed." In the former the poet consecrates the many obscure Philip Sidney acts of goodness and selfless kindness which go unrecorded. The enemy-soldier has ministered to the wants of his antagonist as he lay dying on the field. In 'The Man He Killed' the soldier wonders how he could kill a man whom, in ordinary times, he would entertain at an inn. Were they not struggling in peace with the hardship of daily life without any quarrel? Wars are artificial. The horrors of war are the contrivance of man and the hope for man is in the natural human relationship being strengthened. So the enemy-soldier's deed of grace receives fitting praise, though such may be forgotten in the loud clamour of the battlefield.

"Yet larger vision than loud arms bespeak
He there has reached, although he has known
it not.

For natural mind-sight, triumphing in the act
Over the throes of artificial rage,
Has thuswised muffled victory's peal of pride,
Rended to ribands policy's specious page
That deals but with evasion, code, and pact.
And war's apology wholly stultified."

And the phantom of an English soldier
thus moans every night from African graves:—

"* * I would know

By whom and when the All-English-glad-
dening Law
Of Peace, brought in by that Man Crucified,
Was ruled to be inept, and set aside?

And what of logic or of truth appears
In tacking 'Anno Domini' to the years?
Near twenty-hundred liveried thus have bled,
But tarries yet the Cause for which He
died."

The undertones of mournfulness in the patriotic departure to fight on foreign soil are heard in the lines

"How long, O striving Teutons, Slavs, and
Gael
Must your wroth reasonings trade on lives
like these,
That are as puppets in a playing hand?—
When shall the saner softer politics
Whereof we dream, have sway in each proud
land
And patriotism, grown Godlike, scorn to
stand
Bondslave to realms, but circle earth and
seas?"

The realisation of world peace is dear to him and he was interested in the promotion of international understanding. In his "Castles in Spain," Mr. Galsworthy quotes Hardy's words 'The exchange of international thought is the only possible salvation of the world.' Hardy pleads with statesmen for wise guidance and example in the poem 'Murmurs in the Gloom' dated 1895.

"O Dynasties that sway and shake us so,
Why rank your magnanimities so low
That grace can smooth no waters yet,
But breathing threats and slaughters yet
Ye grieve Earth's sons and daughters yet
As long ago?

Live there no heedful ones of searching
sight,

Whose accents might be oracles that smite
To hinder those who forwardly
Conduct us, and untowardly;
To lead the nations vawardly.
From gloom to light?

It was reported that in a London library the 'Dynasts' was in large demand among readers, a tribute, undoubtedly to the realism, large cosmic vision and the meliorative influence of the presentation of the spectacle. The human mind changes very slowly and a revolution may be effected in time by men's effective grasp of the bearings of war upon civilisation, man and the future of both. Hardy's war poems might fill a volume and, in the promotion of sincere and genuine community of thought, no better literary embassy is available.

The Spirits of Pity have the last word in the 'Dynasts' and strike a note of hope. In the five years of the game of Death from 1914 to 1918 men had grown familiar with the use of words like 'dug-outs,' snipers,' 'Huns.'

"And 'Hell!' and 'Shell!' were yapped
at Loving kindness."

Just when despair of real progress was taking men in its grip, there was the cry 'War is done'! and the sounds of deliverance seemed strange to those on whom war laid affliction. The spirit of Irony seemed to smirk at the cessation of adventures 'woven of rage and wrong.' But the release came and with it relief.

"Thenceforth no flying fires inflamed the gray,
No hurtlings shook the dewdrops from the
thorn,
No moan perplexed the mute bird on the
spray;
Worn horses mused: "We are not whipped
to-day;"
No west-winged engines blurred the moon's
thin horn.
Calm fell. From Heaven distilled a clemency;
There was peace on earth, and silence in the
sky

Some could, some could not, shake off misery:
The Sinister Spirit sneered: 'It had to be!'
And again the Spirit of Pity whispered,
'Why?'"

Hardy's inspiration has been the genius of Pity, manly and tender, not sentimental, and dropping gently like the dew of heaven. War is a temporary madness with no place in the scheme of things. Wars come and go. Life and Love, living and loving, processes of agriculture and love-making remain. This utterance already noted in 'The Souls of the Slain' finds expression in the Poem "In Time of The Breaking of Nations" so well-known.

I.

"Only a man harrowing clods
In a slow silent walk
With an old horse that stumbles and nods
Half asleep as they stalk.

II.

Only thin smoke without flame,
From the heaps of couch-grass.
Yet this will go onward the same
Though Dynasties pass.

III.

Yonder a maid and her wight
Come whispering by:
War's annals will cloud into night
Ere their story die."

The fulness of the years may bring to birth the happy earth of the poet's dream in the poem 'His Country' written in 1913 the year of the opening of the Palace of Peace at the Hague. Travelling on and looking around, the poet cannot find the boundary of his native country. He discovers his 'world-wide denizenship'

"I asked me: "Whom have I to fight,
And whom have I to dare,
And whom to weaken, crush and blight?
My country seems to have kept in sight
On my way everywhere."

Can there be a bitterer taunt than that of the moon in the poem 'I looked up from my writing,' when in her meditative gaze into the poet's room she tells him of the suicide of a broken-hearted man whose son was no more?

" 'Did you hear his frenzied tattle?'

It was sorrow for his son

Who is slain in brutish battle,

Though he has injured none,

And now I am curious to look

Into the blinkered mind

Of one who wants to write a book

In a world of such a kind."

DISCONTENT.*

IN sheer despair for want of a suitable subject on which I may possess sufficient knowledge to be able to speak to you with authority and to which you may listen with patience, I have neglected to seek your co-operation in investigating the causes of discontent which hostile critics attribute to our profession. The epithet divine appearing in the programme is not mine but I have borrowed it from an administrator whose favourite theory is that discontent is the root-cause of all improvement in society and body-politic. I am not very keen on discussing this proposition, and if there is any discontent among the teachers, I shall address myself directly to it. I have reflected over the probable causes which may have contributed to produce this sourness of temper and possibly you may not agree with my analysis. I am not quite sure if discontent is at all necessary for improvement of the teacher's mind or for increasing the efficiency of his work in the class-room. I can visualise that there are a great many causes which must have assisted to produce this unhappy frame of mind.

So far as I can see, one of the main causes is that the symbol of the teacher's profession has been snatched away from his hands. Naturally he feels that the disappearance of the sceptre of his sway from the class-room has introduced into it a form of government more akin to Bolshevism which must be repulsive to the well-regulated and strictly constitutional mind of the teacher. There is a great deal more of philosophy in the rod than is dreamt of even by the Science teachers. The old aphorism that even the gods are mended

* An Address delivered by Prof. C.R. Narayana Rao, M.A., L.T., Central College, Bangalore, at the Third Secondary Educational Conference, Bangalore.

by the rod invests this instrument of discipline with a halo of holy tradition and the popular saying "Spare the rod and spoil the child" is a condensed summary of the practical wisdom of mankind. The Jesuits were the pioneers in the liberal use of the rod in their monasteries. Their theory was that the mind of the child was partly or wholly tenanted by the devil who has to be exorcised by the rod, a practice which is most enthusiastically adopted by the devil-drivers to-day. More than the devil, it appears to me that the rod in the Jesuit's School was part of their spiritual discipline under which the mortification of the flesh was to produce a suppression of the carnal appetites. An extreme form of this mode of disciplining the body for final conquest of the mind resulted in the establishment of a religious order known as Flagellants. In our own class-room our ambitions are more modest. We have been using the rod firstly to overcome laziness and secondly to drive knowledge into the head of the pupil through skins of varying degrees of thickness. We hide this real purpose under the cloak of chastising indiscipline and moral delinquencies and to promote respect for authority. Whatever harsh things may be said against this well-tried and much useful weapon, I maintain that it served a very important purpose in the class-room and I am sure that you have not interpreted this purpose from my viewpoint. I have no faith in gently tapping the palm of the pupil, for it produces irreverence to your physical prowess. (When I was at the Training College at Saidapet, I remember being privileged to administer three cuts to a boy in the Fifth Form, more prone to mischief than to attend to what was going on in the class. This was an old offender.

Needless to say that I put all my energy into the business. One cut sent him down. The Superintendent imagining that the boy was feigning, took the cane from me and applied it lustily on the back. The whole process is, I admit, barbarous. But the effect on the boy all the same, was miraculous. When he met me on the road in the evening he saluted me and finally became a diligent, model pupil in the class). The psychology of the matter is simple. There is generally always a lot of fluids of different densities in the eyes, nostrils and mouth which make the boy lazy and when during prolonged weeping he eliminates the clogging stuff under the influence of the rod, the body and mind are restored to their natural elasticity. This is the physiological function of the rod, namely, to enable the boy to get rid of the obstructing fluids from the system so that the parts of it may function properly. The reason why the rod was abolished from the school is that you do not apply it for the purposes for which it is intended. We need not however regret its absence and become discontented on that account. We have another far more efficient weapon in our hands, which no Government circular can take away and which is a supreme educational force, if rightly applied. You ought to be able to provoke the laughter of your pupils, whenever you discover that attention in the class-room is wanting. We are told that a thoroughly good laughter has a better physiological effect on the system than weeping, though both are cleansing processes. Let the pupils laugh till their tears run down the cheeks and blow their noses and wipe their mouths. They will have exercised their lungs, heart, muscles of the body and face till they flush. Then they brighten up. After the subsidence of this

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explosion of pent-up energy and the elimination of accumulated fluids, the oxygenation of the blood and the exercise of the muscles, switch the pupils on to the lesson. The effect will be magical.

Another reason of discontent on your part is perhaps due to the fact that the pupils are not permitted to be detained in the Fourth and the Fifth Forms and those in the Sixth Form are all required to be presented to the Final Examination. Unfortunately in India, more especially in the South, examinations have been permitted to assume a magnitude and importance out of all proportion to the position they occupy in the scheme of education and consequently the methods of teaching and learning have been subordinated to the secondary considerations of examinations. The consequence is that the whole process of education has degenerated into a game of manœuvres, and the relations of the teacher and the pupils depend upon the skill on the part of the teacher in anticipating the plans and designs of the examiner.

In my opinion the function of any public examination ought to be a review of the progress made by the candidate with reference to the educational conditions and opportunities under which he had worked. In the nature of things there is bound to be difference between school and school as regards equipment, methods of instruction and teaching capacity of the staff; and it is neither equity nor justice to apply the standard reached by one school to another perhaps less favourably situated. It is quite plain that the pupil can learn only what his educational environment provides and it is equally plain that he is to be judged with reference to it and not by any external standard, however uniform it may be. The

imposition of an external standard of requirement as tested by the public examinations has reacted disastrously on education,—the curriculum is cramped, there is neither freedom nor choice in the methods, the schools can never develop individuality, which a more elastic and humane system promotes.

There is another aspect of the problem which we are apt to ignore, especially in judging the attainment of the scholars either at the class or public examinations. The function of the class examination is simply to find out if the methods of teaching adopted in the class-room have tended to foster habits of industry and systematic work in the pupils and not whether a certain standard of knowledge has been attained on the basis of which promotions are to be regulated. The class examinations, like the *viva-voce* questions during the progress of the lesson, are no more important than as a means to enable the teacher to find out if his methods are correct or require reformation and should not proceed on the basis that the methods of a teacher are unalterably correct and the functions of the Fourth and the Fifth Form tests are to determine differences in the levels of attainment of pupils. To look upon the examinations as sifters is to take a perverted view of them and to ignore the damage done to the precious human material which at this critical formative stage of development we have to use every educational endeavour to promote, and direct its growth to worthy ends. I grant that the examinations as sifters come in, however, only when the pupils have to enter from one grade of instruction to another involving different ideals, methods and content of work, for a profitable understanding of which a satisfactory preliminary training is essential. It is difficult to define

in specific terms what is really connoted by "satisfactory", but at any rate it should not mean "arbitrary."

One other aspect of education generally not recognised must be kept in the foreground in devising the examinational scheme. The curriculum of study to which a boy of seventeen in the High School applies himself, represents a body of knowledge which mankind has taken ages to acquire and consolidate. Now our examinational standards demand after a three years' course in the High School, in our young men an attainment scarcely reached by those who built up the Sciences and Arts. There cannot be much introspection, least of all any psychology, in our attempts to teach the immature youth, in three years a range of knowledge accumulated for years by the adult minds and it is certainly not a rational system of education whose results are to be tested without regard to the state of development of the juvenile minds, and their relation to the body of information required to be mastered. If education is a life process, then the education of the youth must follow that of the human race and a review of the results, namely, examination must make allowance for the failures and mistakes which mankind made in its own education and which every individual youth must inevitably repeat. This view of the Recapitulation Theory of education ought to make the examination more natural and should be so devised that the students take it without extra preparation. Where there is not much introspection or the scientific habit of mind on the part of the examiner to imagine the psychology of the youth in the critical period of adolescence, then examination reduces itself to the simple terms of the Law of Battle, as illustrated

in the struggle for life in Nature. For this reason, all examinations are at present directed more to spy out gaps in memory work. If on the other hand education is the process of unfolding or discovering latent talents to the scholars, then examinations cannot be other than a means of ascertaining the mode and direction of this unfolding and not how such unfolding or discovering has not taken place. Let us remember that education is the mistress, and examination only a handmaid.

If our discontent is due to the fact that we are not permitted to use the class examinations as sifters for the detention of students, then I must ask you to take a more enlightened view of the situation I have described and look upon the departmental circulars with a more hopeful and happier frame of mind. This will enable you to go directly to the backward students and pull them up, instead of surfeiting the forward ones with over-attention for spectacular purposes.

If on the other hand, our discontent arises from the fact that in spite of our honest endeavours we do not succeed in producing a race of Dewans, statesmen and captains of industry, then let me hasten to tell you that if you place any such ideal before you, you ought to be prepared to meet with failures. Any teacher who sets out to work with this aim simply does not understand the material he is handling. A class of 50 pupils represents fifty different types of minds and each mind is a kaleidoscopic figure, the colours of which are traceable to the deeper roots of the ancestral stock on both sides of parentage. We are generally disappointed in our expectations to find brilliance in children coming from enlightened homes but are agreeably surprised to find it in pupils belonging to

illiterate parents. We are given all sorts of metals and mud and are required by the touch of educational alchemy to transmute them into bars of gold. Let us not pretend that we are capable of this miracle, but frankly admit that if clay is given, we will try to polish it, if gold comes, we will polish it too, but in trying to convert the former into the latter we pretty nearly succeed in the reverse process. I am aware that ignorant parents and other unsympathetic critics do not have patience with us for not achieving the impossible; that is due to the fact that they know nothing about the mental power which the child inherits from the parents, the unconscious education which the child imbibes in the street, market and places of amusement, all so hostile to the efforts of the teacher, and above all the total unconcernedness of the parents to what happens to their children in places of education and places of destruction. In the education of children there are three factors which ought to co-operate: the parent, the street and the teacher. The first is apathetic, the second hostile and in the face of odds, the third becomes futile. My marvel is how the teacher is able, in spite of such adverse conditions, to achieve the success that he produces. At present he is commissioned to steer through shoals and rocks, tiny little boats without a knowledge of the sail, rudder and compass. The shoals and rocks are what the child witnesses, hears and smells in the streets; the sail is the mental equipment which the child has inherited from the parents; the rudder is the unconscious content of the child mind, submerged but most potent in its steering influences; the compass is the other two layers of the mind, the unconscious and the sub-conscious, which are

exquisitely concealed from the captain,—the teacher. Let us remember that we have to deal with 50 different boats whose make-up differs from one another as widely as possible. The study of child psychology has been of little use to us in guiding these minds. Let us supplement it with a study of the child's inheritance. It may help us. There lies our hope. For unless we know what is present in the child mind we cannot lead it out,—the official definition of education. Let us not be discontented on this account. Perhaps our discontent may be due to the fact that we are pursuing a sorry trade. True there are no prizes of life in the teaching profession. It seems to me that for purposes of emoluments the Governments in general divide the services into three categories, Heaven-born, Earth-born, and Education. There is the deep-rooted impression that education is a spending and not an earning department and any amount that is now expended on it must be received with gratitude. Above all the teachers are very often told that all the world over they are paid at a flat rate which keeps them half immersed in water. Finally he is exhorted to find solace in the noble profession which is its own reward. Then the teacher has to face the outspoken critic who sees in the progress of education an increase of unemployment and therefore the schools ought to be closed. Others regard education as a luxury of the idle and not the necessary of the busy. I am afraid the lot of the teacher is like that of the proverbial flying fish, pursued in its own element by the deputy sharks, assistant sharks and sub-assistant sharks and in the air, by public-spirited kites of all beaks and talons. You ought not to be dis-spirited on this account.

The Department of Education all over India suffers not on account of inefficiency of

organisation but chiefly through lack of expert interpreters to the authorities of its true place and function in the scheme of administration. There must be at all times a great and insistent demand for economy of the expenditure of public funds but could it be at the sacrifice of the children who in the next generation will occupy the places from which economy at their expense is preached at present. Would it be difficult for broad-minded statesmen to realise that the Western countries which have created immense wealth through industries and commerce were able to do so through their teachers? Hence the money spent upon the Educational Department is in the nature of productive investment. It does not certainly require statesmanship and outlook for the future to recognise the simple fact that a teacher drawing a salary of Rs. 15 plus Rs. 7 as a grain compensation allowance, is not the man who will re-orientate the mind of the present generation to assume charge of the administration in their day. It seems to me that the real cause of discontent,—if there is any under this head, can only arise by comparisons of one branch of service with another. Comparisons are always bad but the human mind can hardly resist the impulse. The removal of such comparisons between service and service in the same administration must be only a question of time. It is bound to come though not immediately, for teachers are public servants equally with those who serve the State in the other great departments of administration and are therefore legitimately entitled to better emoluments. The reason for this claim is that the task of dealing with that invisible and indefinable something which we call mind must be at all times a far more delicate and arduous duty than those of any other department.

Perhaps the more real cause of discontent in the educational service so far as I could see is due to the fact that the teachers do not have sufficient leisure for the improvement of their minds. Those who compare the work of the teacher with others labouring at the desks, forget the fact that in the class-room about 40 to 50 intellectual mouths capable of strong sucking powers, because juvenile, are applied to the mind of the teacher and he has to stand this drain for 4 or 2 hours day after day. What little leisure he gets is consumed in the correction of exercises or acting in vacant incumbencies. Every one ought to sympathise with the teacher who complains that his mind is drained faster than is replenished and who seeks for leisure to restock it with information. A conscientious teacher in order to be able to do 22 hours of intense mental work in the week must spend at least 3 times that number in preparation in the school premises. If you proceed to draw up your time-table on this basis including your private study and sleep, you will find that you have hardly any time left for your prayers.

A man who has not lived education will not appreciate the difference between class-work and desk-work and the fate of all teachers who are overworked is the lunatic asylum. We are told that our motto should be "Gladly will I learn and gladly will I teach." How many of us have time for the former, how many of us fulfil the latter to our satisfaction! People forget that the one reacts on the other.

I would not at all costs be discontented under any of these circumstances and I would ask you not to be. They are incidental to the evolution of a great department in India having to deal with nearly 20 millions

of children in their formative stage. The great drawback of the present educational organisation is that it is not free from empiricism. Education is a technical subject like surgery, but education, medicine and music have been the favourite subjects for the laymen to express his *ex-cathedra* opinions. All this will stop sooner or later. In the meantime I want you to cheer up and prove that education is really technical, that the work of handling the minds of others is at once delicate and arduous, that if your profession is truly noble it ought also to be practically noble as a trade, that you require more leisure for the improvement of your own minds so as to react favourably on those of others.

The League is the proper place where problems such as these and others of graver import ought to be discussed and the success of the League depends upon its compactness, organisation, loyal discipline and competent leadership in the right direction. As New Year Greetings from one who is himself a teacher and who can readily sympathise and co-operate with you, I wish the League and its members a long, prosperous and useful career of public utility and distinguished service to the State.

Let me thank you for according to me a patient hearing.

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HOW ONE CAN IMPROVE ONE'S VOCABULARY.

By

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EVERY one knows that a good stock of words whose meanings are clearly understood is an indispensable element in intellectual culture. But who has taken care to improve his vocabulary? Who has not felt himself handicapped for lack of command of just the right word? If we examine the vocabulary of the average college student, we find that he has a little above a thousand words at his command. The business man is not much better equipped, while the educated man may be said to possess a working knowledge of about three thousand words. Yet considering the fact that the English language consists of about two hundred thousand words, no two words having, strictly speaking, exactly the same meaning, it becomes necessary for every aspirant after culture not only to increase the stock of words at his command but to cultivate habits of clearness and precision in using them. For words are the instruments of thought and the degree of mental development a man has attained can be measured by the quantity of his vocabulary and his ability to distinguish subtle shades of meaning between apparent synonyms. Readers of Ruskin are aware of the mischief caused by what he calls 'masked' words, and of the emphasis that he lays on a proper study of the meanings of words in the reading of an author. The necessity of studying English words is very great to the Indian student as English is a language which has very little in common with Indian vernaculars.

Every one has three vocabularies; one, the smallest, used in every-day speech, a second, larger than the first, used in writing, and a third, the largest employed only when reading a book, *i.e.*, in order to understand the author. The large number of words making up the third set is only on the waiting list but never pressed into active service. The growth of our vocabulary therefore depends on the free and correct use we make of these words. We have only to overcome some initial shyness to be able to use them.

Again in finding out the exact value of words, the use of the dictionary cannot be sufficiently estimated. How many of us feel inclined to pass over an unfamiliar word without looking up its meaning in the dictionary! In the dictionary we have not only the derivation of a word but its various significations with instances of their usage quoted. A reference to the dictionary fixes up the meaning of a word in our minds and makes readier and fitter to use it when need arises. It is a pity that the present college students make very little use of the dictionary, the habit of depending on notes and cribs having been ingrained in them from the outset.

In mastering a new word with the help of the dictionary, we have to learn three things about it (1) its meaning, (2) its spelling and (3) its pronunciation. We see how students and even public speakers make themselves ridiculous by using a word whose meaning they are ignorant of. If one does not know the correct pronunciation of a word, one feels diffident to use it in public and thus loses an opportunity of mastering it. Thirdly, ignorance of the spelling of a word makes one reluctant to use it and content oneself with a substitute which expresses one's idea

only inadequately. One can become thorough with words only when one uses them in one's conversation or composition.

In studying the meanings of some English words, one feels one could better know and remember their meaning by noting their derivation. Latin being the source, direct or indirect, of nearly one half of English words, a knowledge of that language certainly enriches one's knowledge of English. It should be remembered, however, that a dictionary goes only a short way towards improving our vocabulary. In a lexicon, the words are at rest. But in the best books of the best writers, they are full of life and activity. To be able to use words with the proper meaning, one has to read the books of great writers with care and accuracy, noting the exact context in which a word is used. A sympathetic and intelligent study of literature gives us the proper appreciation of the value and import of a word.

To get familiarity, ease, fluency and precision in the use of words, mere reading is of no avail: one has to write. Then one feels the necessity to hunt up just the word that conveys one's idea. Good writing has been described as "*proper words in proper places*." The careful writer has to spend much thought and make a careful search before he can express himself fully and unambiguously.

There is another valuable exercise which is of immense use to the Indian student in enriching his English vocabulary, and that is translation. The writer knows instances of students in the case of whom translation of a passage from Telugu into English and *vice versa* have proved a potent means of improving their knowledge of English vocabulary and English idiom. In order to make satisfactory

translation, one must transfer the thought from one language to another without any loss or addition, and without the violation of idiom. Translation brings to the mind all the words we own and trains the memory in the discovery of additional and expressive ones.

A trained student of literature is never content with understanding a passage from a great writer. He would note each word observing fine distinctions and delicate shades of meaning. He realises, for example, the various shades of difference in the meanings of "*pleasure, delight, happiness, joy,*" "*difficulty, obstacle, hardship, hindrance,*" "*pity, compassion, sympathy, commiseration.*" He must make lists of such words as he would meet in the course of his reading. Strictly speaking there are no synonyms in English and the lists given in some books of "English Synonyms" though no doubt good, must be regarded as being only roughly correct.

Precision and elegance of diction will go a long way in giving literary value to a piece of writing. The student has to cultivate therefore a sense for words. The English Bible owes its literary excellence to this quality of inevitableness. The avoidance of slang and hackneyed expressions like "How lovely" and "How horrid" to express approval or disapproval betrays only poverty of thought and inelegance of style and taste.

One has therefore to be all ear when conversation of educated Englishmen is going on around one. One should keep one's eyes open in reading so that one may note each word that is new in itself or in the meaning given to it.

THE PLACE OF LITERATURE
IN MODERN LIFE.*

A BRIEF survey of the past position of literature in the West and the East will greatly facilitate the discussion of the above subject. In the West, literature in its earliest stage was in the form of songs or ballads dealing with some pathetic or heroic incident, and accompanied by music and dancing on festive occasions. These ballads centering round some national hero came later to be collected into the epic, which served both as a fitting memorial to the hero and as remembrancer of the past national glory. The ancient Greeks were famous for their love and cultivation of letters, and developed to perfection almost every branch of it—tragedy, comedy, epic, lyric and rhetoric. The fact that their dramas were staged before tens of thousands of people, in theatres extending over miles, bespeaks the high position and popularity of literature in the Greek nation. Next, the Romans carried on the torch of letters handed to them by the Greeks and maintained their level of efficiency. They further enriched it by developing the art of rhetoric. Literature in the form of orations from Cicero and Demosthenes kept millions of people spell-bound and shaped the destinies of nations. But even in the golden ages of Greece and Rome, it met with the reaction led by the Greek philosophers of the school of Plato, and the Roman soldier-politicians like Cassius, who condemned it for spreading lies and immoral ideas. But these reactionaries were like drops in "an ocean of supporters, and could not diminish the prestige of literature

* A résumé of the inaugural address delivered by Mr. G. V. Subbaramayya, M. A., to the Nellore Government Training School Teachers' Association,

to any appreciable* extent. Even in the succeeding dark ages of medieval Europe, literature found its devotees in the abbots and monks who made it the medium of their theological teachings. But the masses were wallowing in ignorance and superstitions, oblivious of its benign influence. The Renaissance and Reformation movements revived in men the classical attitude towards literature which now took a secular turn and was used as a potent weapon of revolt against every medieval superstition, against every form of social and religious corruption. Literature again became a fine art. The drama attained a popularity unheard of before. Love and patronage of letters became a national sentiment. Simultaneously, however, there was going on the inevitable reaction led by the Puritans who levelled against literature the old charges of untruth and immorality. This opposition reached its climax in England in the reign of Cromwell, when all literary activity seemed to be paralysed. With the Restoration, it re-asserted itself, of course with a vengeance. The corrupt tastes of the court led it for a time into unhealthy channels; but, thanks to the exertions of literary reformers like Steele, Addison and Swift, it was restored to its normal sanity. But the political developments in the meantime effected a great change in its form and spirit. Literature, now deprived of the patronage of the nobility, and having to depend upon the enlightened middle classes for support, became more and more democratic in spirit. Big literary ventures had not the needed help and encouragement, and so, novels and periodicals came into being. Politics and physical sciences occupied the fore-front of national attention, relegating literature into the background. This tide

was stemmed for a while by the Romantic movement which by producing great artists, nature-poets and critics, brightened and widened the literary firmament, and spread an aroma around the national consciousness. But the current of industrialism proved too strong and swept away every barrier in its impetuous onrush. Amid the trumpet-call of politics and the golden jingle of industrialism, in the deafening din of the 'struggle for existence,' it is no wonder if the flageolet of literature was scarcely audible!

From the earliest times, the East has considered literature as a sacred art, and shown it the highest regard. The Vedas, the Koran and other scriptures were the best literature of the ancient times and paved the way for the later epics written partly to eulogise the national heroes and partly to illustrate the profound truths of religion. The authors were the great sages and their writings were believed to be divinely inspired. In later times, literature became more secular and its æsthetic aspect received prominence from great poets like Kalidasa. It received royal patronage and was even regarded as a fit avocation for the highest aristocracy of wealth as well as of intellect. In course of time, the vernaculars gained importance, and all the great classical work came to be translated into the respective mother-tongues. Then owing to changes in the political conditions, the literary taste of the people deteriorated. The authors lost the power of originality, and were content with feeble imitations of classical works. Literature in short, ceased to be a force in the land. With the advent of the Europeans into the East, a new era in our literature may be said to have begun. The spread of Western

culture has, no doubt, given a stimulus to the revival of our own literature. But we are not yet past the stage of imitation, and are still groping in the twilight of transition, praying for that Kindly Light to lead us on.

The present position of literature is, of course, the inevitable outcome of its past career. For political, economic and other reasons, we are fast getting out of touch with true literature. To most people, it is a sealed book. It is at a discount, for it has no market-value. Even to the few in whom the literary taste is not altogether extinct, it means perhaps a few novels and magazines, which are sought, not for serious study for which we in our 'sick hurry' of modern life have neither time nor inclination, but as relaxation and escape from professional worries. Really good, high-class literature has neither the patronage of the wealthy nor the countenance of the common people. We seem to be fast reaching a time when literature may be put down as a relic of barbarity, as some 'sentimental stuff,' when our best literary works may become objects of curiosity to the antiquarian! Life is becoming for us a continual struggle against adverse economic forces, in which all indulgence in art and literature becomes a piece of truancy!

What, on the other hand, should be the legitimate place of literature in the scheme of things? It should enable all the best impulses of mankind to find in it their free expression. It should serve as the best education of humanity, by giving full play and exercise to every god-given faculty lying dormant in us. Viewed thus, it is all-inclusive. It may amuse us by pleasing our fancy; it may edify us by attracting our minds towards virtue; it may give us a searching 'criticism of life,' it may relax our minds from more

strenuous pursuits; it may divert us for a while from life's dull routine. But above all, it should preserve in us what seems to slip from us with our boyhood, that is, freshness of outlook, openness of mind, sensitiveness to the impressions of Nature. It should open our mind's eye to the ever-present vision of the Ideal, and fill our hearts with divine discontent against every evil and deformity of the world. It should keep us ever alive to the unending mystery of our existence, ever in contact with the eternal verities. It should prove the best soothing and civilising force on this war-stricken, passion-ridden planet. It should serve as the strongest cementing tie among the different nations of the world, by making them realise the essential unity of the human race.

To achieve this consummation, one cannot think of better means than the recipe prescribed by Ruskin. Wherever possible, we must establish public libraries containing the best books, the classics in our mother-tongue, in Sanskrit and in English. We must popularise the use of these libraries by ourselves setting an example. This we can do without the least sacrifice of our usual activities. Only we should find time, should find at least half an hour every day, to read one classic, it does not matter which it is, Homer or Virgil, Shakespeare or Milton, Valmiki or Kalidasa, Tikkanna or Erranna. We must not commit the mistake of thinking that they are hackneyed. The really great works, the classics, can never become hackneyed. They on the other hand gain new interest with every repetition. We have still among us a beautiful tradition in observance of which our orthodox people recite a chapter from some sacred book at the time of prayer. It should be a nice thing if we can keep up this tradition with regard to our literature, avoiding of course its drawback, i.e., reading without understanding the sense. This domesticating of our classics will serve, I dare say, not only as the best tonic for the modern 'civilisation' which is getting dropsical of late, but as the precursor of such national glory as we have not dreamt of.

A DOUBTFUL CASE OF MATHEMATICAL RATIONALE.

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ONE principal feature of modern teaching of Elementary Mathematics, even in lower classes, consists in the explanation of the rational basis underlying any principle or rule taught. Thus the multiplication tables, the operations with fractions, the rules of L. C. M., H.C.F. and square root, formulae in square and cubic measure—all these are never taught in these days without their rationale; and besides even in such teaching, aid of all concrete and practical illustrations is invariably summoned. We must render all honour to the modern method which has done away with the dogmatic enunciation of rules and their mechanical application. However, this modern tendency of rationalisation of mathematical principles has, as several educationists have admitted, overstepped its legitimate bounds in a few cases, mixing up rationale with convention. The algebraical rule of signs in multiplication and division of directed numbers is a case in point. Already it is being slowly recognised that this rule has no rational basis; nevertheless rational explanations of the rule still continue to appear in modern text-books and are probably resorted to in the modern classroom. Hence a close examination of the whole matter would be worth our while. And since the rule of division is derived from that of multiplication, an examination of the latter would suffice for the purposes of this paper.

A teacher that is engaged in giving a lesson on this law of algebra is in a very peculiar situation. In accordance with the modern method he has, at the very outset, to place before his pupils' minds some practical examples, from a study of which the law can be drawn out by the inductive method before a theoretical examination of the law is taken up. In this respect he is trying to follow the method of the science teacher, who as a preli-

minary to a theoretical study of scientific laws demonstrates a number of experiments to manifest the laws. Again, he is following the method he himself adopts in the teaching of Geometry, wherein he makes his pupils do some experimental work and produces sufficient data for obtaining the theorems which are afterwards studied separately in theory. But there is a vast difference between this algebraical law and its illustrations on the one hand and the laws of science and Geometry with their illustrations on the other. The examples in science and Geometry illustrate the invariable relations that naturally exist between certain conditions and results, and hence these examples in virtue of their existence in nature or practical life are real; whereas the algebraical law in question is a pure creation of our abstract thought, and examples or problems of daily life never involve the multiplication operation of directed quantities. So long as this is a fact, the examples employed to illustrate this algebraical law must be unreal and artificial, having only a forced application. To show the artificial character of these examples a few specimens in current use could have been exhibited here; but it has not been done for want of space. There is, however, one solitary practical example in Physics involving the application of this algebraical law: namely the measurement of the moment of a force acting upon a rigid body rotating about a fixed point. This may be regarded by some as a little too technical a matter to be freely used in Elementary Mathematics. Be that as it may, this example or others artificially coined cannot be used, as is commonly done, to deduce the law, but can only be used to interpret certain results in the light of the law after it is once established. Thus, in the example of the moment of a force, its positive or negative nature is capable of arbitrary decision, and it is interpreted to agree with or suit the law already established. Ever after the law is once accepted, it is never applied in any practical example except the one in Physics already mentioned. Its other applications can be found only in the abstract science of algebra and

theories of applied sciences. Thus it is clear that the rule of multiplication of directed numbers being such as it is, no practical examples can be got from which the rule can be deduced by any method of reasoning. And when we come to the continued multiplication of directed numbers, the question of practical examples, real or unreal, for whatever purposes, is out of consideration altogether.

Now coming to the so-called rationale of the rule in abstract theory, how will the teacher find himself in his task? He has to explain something about which he has no strong conviction himself, but must find that he is adopting a dodge to convince his pupils. Because there is the prevalent notion that this rule has a rational basis, he in his deference to this opinion trots out the make-believe explanation found in text-books—but to be sure, he would not, after his performance, fail to be amused by the manner in which the non-recalcitrant young minds have been easily imposed upon.

Now what are the "rational" explanations of the rule? They are principally three in number, though there are one or two more which will be omitted, as they are on the very face meaningless or irrational. These three explanations are as follows:

(1) We know that $5 \times 3 = 15$. Here all numbers are positive. Hence the product of two positive numbers is positive. Again $(+3) + (-3) = 0$ $\therefore (+5) \{ (+3) + (-3) \} = 0$. But $(+5) \{ (+3) + (-3) \} = (+5)(+3) + (+5)(-3)$ $\therefore (+5)(+3) + (+5)(-3) = 0$. But we know that $(+5)(+3) = +15$ $\therefore (+5)(-3) = -15$, as $(+5)(-3)$ together with $+15$ must give zero. Again taking the multiplier to be $+5$ and the multiplicand to be the binomial $(+3) + (-3)$, it can be shown as above that $(-3)(+5) = -15$. Again taking the multiplicand to be -5 and multiplier to be the binomial $(+3) + (-3)$ and making use of one of the results already obtained, it can be shown as above that $(-5)(-3) = +15$.

(2) We know that $(+3)(+5) = +15$. Now we shall find the product of $(+3)$ and (-5) . $-5 = (+1) - (+6)$ $\therefore (+3)(-5) = (+3) \times \{ (+1) - (+6) \} = (+3)(+1) - (+3)(+6) = (+3) - (+18) = -15$. Similarly it can be shown that $(-5)(+3) = -15$. Again we shall find the product of (-3) and (-5) . $(-3) = (+1) - (+4)$ and $(-5) = (+1) - (+6)$. $\therefore (-3)(-5)$

$= \{ (+1) - (+4) \} \{ (+1) - (+6) \}$
 $= \{ (+1) - (+4) \} (+1) - \{ (+1) - (+4) \} (+6) = (+1)(+1) - (+4)(+1) - (+1)(+6) + (+4)(+6) = (+1) - (+4) - (+6) + (+24) = +15$.

(3) We know that $(+3)(+5) = +15$. Now we shall find the value of $(+3)(-5)$. Evidently this is numerically 15. As regards the sign it must be either positive or negative. If $(+3)(-5)$ were $= (+15)$ we should have $(+3)(-5) = (+3)(+5)$, because $(+3)(+5)$ is known to be $+15$. Now this is an equation which indicates that two products are equal. The first factor in each product is the same; therefore in order that the two products may be equal, the second factors in the two products must be equal—which is not possible, as the second factor in the first product is (-5) and that in the second product is $(+5)$. Therefore the assumption $(+3)(-5) = +15$ is wrong. $\therefore (+3)(-5) = -15$. Similarly $(-5)(+3) = -15$. Similarly, using the second or third result it can be proved that $(-3)(-5) = +15$.

NOTE 1. The above operations may be performed and similar results may be obtained by the same reasoning with regard to the multiplication of general directed numbers like $(\pm a)$ and $(\pm b)$.

NOTE 2. The $+$ sign in the above is generally omitted when it is used to indicate the positive character of a number, and when it is used to indicate the addition of a negative quantity, e.g. $(+5) \{ (+3) + (-3) \} = (+5)(+3) + (+5)(-3)$ is written like this: $5(3 - 3) = 5 \times 3 + 5(-3)$. Such omissions are not made

in the above 'proofs' to avoid any difficulty and confusion that might happen when an attempt is made to examine the logic of the 'proofs.'

Now to examine the 'proofs' of the rule. It is seen that in all the three explanations or 'proofs' it is assumed either that all ordinary numbers are positive, or that the product of two positive numbers is positive. The latter assumption deprives the explanations of all the force of rationalism and reduces them to a simple convention. And as for the first assumption it is absolutely unwarranted; because ordinary numbers are not positive numbers. How? Directed numbers, positive or negative, represent measures of certain quantities of a specific qualification. For example, when we say that the height of a place A, is $+100$ yards, we may take it to mean that the place A is 100 yards *above sea-level*; then we are to regard a height of -80 yards of a place B as the distance of 80 yards of the place B *below sea-level*, because the two kinds of directed quantities are of opposite character. Thus, the conception of a positive quantity necessarily grants the conception of a corresponding negative quantity: in other words both the classes of quantities must exist, or neither exists. Now when we say that the distance between Madras and Bangalore is about 160 miles, the number 160 here is neither positive nor negative; for if it were positive, what the corresponding negative number represents cannot be conceived. Again when we say that in a certain class there are three sections containing 30 boys each, and that therefore the total strength of the class is 90 boys, we cannot hold that the numbers 3, 30, 90 here are all positive; because we cannot think of a corresponding statement in negative numbers. Thus it is clear that a distinc-

tion is to be made between ordinary numbers which are absolute, and positive and negative numbers which are directed, and it is wrong to regard ordinary numbers to be positive. Incidentally it is to be remarked that the omission of $+$ sign for positive directed numbers, the prefixing of $+$ and $-$ signs to specify the exact nature of directed numbers though these very signs are used for other purposes, and the use of the qualifying terms 'plus' and 'minus' instead of 'positive' and 'negative' in calling directed numbers—all these are not a little responsible for a good deal of confusion, looseness and inaccuracies in the views on operations with directed numbers among young students and others as well. The sooner a reform in that direction is effected the better it is for all concerned. And if these reforms are found desirable, to delay them is nothing short of mathematical conservatism, when changes are being made in the terminology used in other branches of knowledge such as science and grammar.

In the foregoing lines it has been clearly shown that the first part of each of the rational 'explanations' is a pure convention. The rest contains a good deal of reasoning wherein the general principles of multiplication of binomials and removal of brackets are used. Even here some may question the logical validity of some of the steps. At any rate, one who, instead of treating the rule as conventional, holds that it has a rational basis is on a very unsafe ground. Therefore in the words of J. W. A. Young "the best procedure is no doubt simply to *define* the product of two relative numbers as the product of their absolute values taken with the positive sign if both factors have like signs, and with the negative sign if they have unlike signs."

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CAUSAL VERBS IN DRAVIDIAN

By

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INTRODUCTION.

THE causal aspect of the verb-idea is so essential a feature of languages that it should have shown itself at a fairly early stage in language-development, assuming different forms in different groups of languages. When once the idea of the verb in its transitive and intransitive aspects became fairly established in the primitive stages of a language, the need for the expression of the causal idea should have arisen almost spontaneously from the growth of thought. This very early origin of the causals accounts for the fact that, in the inflexional group of languages, the causal verbs have "set," so to say, as independent units, with the verbal roots and the causal formative indissolubly coalesced together. The coalescence has become so close in the Indo-Germanic group of languages that the origin of the causal formative has been completely obscured. Even in the agglutinative groups of languages, as for instance in Dravidian, the coalescence has, in respect of the most active and usual method of causal formation, partly obscured the origin of the formative affix.

One great difference—a difference only to be expected from linguistic structure—between Indo-European and Dravidian in respect of the formation of causal verbs is that the former as represented in modern European languages has completely lost its active power of forming causals from verbs with the help of formative affixes, while the latter retains it still in an active condition. Amongst the ancient European languages, primitive

Germanic alone—and this only in its earliest stages—seems to have had the active power of converting verbs into causals, *e.g.*, *feallian* (*to fell*) from *fullan* (*to fall*). Sanskrit also had the power of converting verbs into causals, *e.g.*,

bodhaya < *budh*

choraya < *chur*, etc.

the derivative base being due to the addition of *i-*.

Greek and Latin do possess, it is true, some verbs so formed, but the *active principle of turning verbs into causals* seems to have been lost at an early stage in these languages. There remained, however, in them the analogous power which enabled them to form denominative causals from nouns and adjectives, as in

Greek *timaō* < *timē*

douloō < *doulos*

Latin *plantayo* < *planta*
 etc.

The "weak" verbs in Germanic, which show a characteristic preterite formation, are mostly denominative verbs formed from adjectives and nouns, though there are also a few amongst them which are causals from verb roots, formed at a comparatively early stage.

When the Indo-Germanic languages ceased to be synthetic and broke up into the analytical languages of Europe, the power of forming causals by means of formative affixes became still further attenuated, except in German where the inseparable and separable prefixes are still active and except in a small class of denominative in the other languages, like *macadamise*, *vernacularise*, etc. Verbs are no longer converted in modern European languages into causals by the addition of

formative affixes, except in a few instances but the causal idea is expressed with the help of auxiliary words meaning "let," "make," "cause," etc.

The North Indian Prakritic languages appear still to retain the case with which causals could be formed from verb-roots in Sanskrit. Hindustani *chal-wa-na* from *chal* and Bengali *kor-aiw-a* from *kor* are illustrations.

FORMATION OF CAUSALS IN DRAVIDIAN.

There are two sets of causal verbs in Dravidian, one set formed on the basis of an ancient and obsolete method and the other resulting from a more modern method which is still active.

(a) *The obsolete and more ancient method.*

This is found best preserved in Tamil and Malayalam and in some cases in Telugu. The rules of causal formation according to this method are the following :

(1) The doubling of the annexed consonant formative of the verb, *e.g.*

Tamil. [po:kkw] < [po:gw] (*to go*)

[el:dkkw] < [el:dgw] (*to shake*)

[kaḍḍttw] < [kaḍḍndw] (*to cross*)

(2) The doubling of the final consonant of the verb-root, *e.g.*

Tamil. [o:ttw] < [o:ḍw] (*to run*)

[va:ttw] < [va:ḍw] *to fade*

[ma:ttw] < [ma:rḍw] *to change*

[a:ttw] < [a:ḍw] *to move.*

This second principle is peculiar to Tamil and Malayalam. Telugu shows *chu-* forms in plenty, corresponding to the Tamil *-kku-* forms; but, in other cases too where Tamil shows

endings other than *-kku-*, Telugu seems to have made *-chu-* uniform, *e.g.*

[va:ḍutsu] < [va:ḍu]

[ma:rutsu] < [ma:ru]

instead of Tamil [va:ttw] and [ma:ttw].

An examination of the above instances and an understanding of their usage will make two things clear : (i) that the root-forms are all intransitive while the derived forms are transitive and (ii) that both the transitive and the intransitive forms are usually used only in reference to "non-human" objects or to involuntary actions of human objects. These features are very suggestive inasmuch as they give us probably a clue to the comparatively early origin of these forms, as distinguished from the next class of Dravidian causatives which, as we shall see below, are formed from both transitives and intransitives, and besides are commonly applied to human beings only. On the one hand in the most primitive stages of language-development, causatives having reference to "non-human" objects such as verbs expressing elementary transitive ideas like the above, would have been felt as a necessity which could not have been merely satisfied by periphrastic formations of the type [o:ḍḍcʃej] or [el:ḍḍcʃej] ; on the other hand, constructions like [po:ḍ cʃol], [naḍ cʃol] would have been quite sufficient, in reference to human beings.

It is therefore, in all probability, correct to say that this form of causals (or derived transitives) appeared earlier in the language than the second variety of causals which we shall next describe. The statement made by Caldwell that this class of causal verbs is considered more "classical" and "elegant" is therefore on this basis easily explicable.

(b) *The current active method of forming causals.**

Tamil. The causals are formed by the addition of *vi*, *bi* or *ppi* to the roots of verbs, the particular affix being determined by the euphonic laws regulating the phonological changes due to combination with other sounds. The formation of Tamil causals of this type is indicated in the *Nannūl* (Section 151) thus:—

செய்யென் வினைவழி விப்பி தனிவரிற்
செய்வியென் னேவ வினையினி ரேவல்

e.g. [varuvi] < [var]
[ʃejvi] < [ʃej]
[timbi] < [tin]
[ka:ɳbi] < [ka:ɳ]
[naɖappi] < [naɖa]

* In respect of the formation of causal verbs, the lesser and ruder dialects of Dravidian do not show any considerable variations from the major languages.

In Tulu, intransitive verbs are changed into transitive causals by using the affix -p uniformly in many cases:

(to finish) mugipu < mugiyu (to cease)
(to blow) uripu < uriyu (to burn), etc.

In other cases, the causal is formed by the use of the affix [a:] or [də] as in

(to cause to make) malpāvu < malpu
(to cause to walk) naɖapuɖu < naɖapu

The affix -p clearly shows affinity with the *vi*, *bi*, *ppi* group of affixes employed in the still active and more modern method of causal formation of the major languages.

[a:] is probably from the root [a:ppu]; and
[də] is probably from the root [id] but one could feel sure here only after further investigation.

The Northern Dravidian languages evidence great influence of Indo-Aryan in the formation of causals.

Pombada follows Tulu; Badaga follows Canarese.

Kodagu and Toda contain a few instances of causal verbs formed as in the major dialects; but, more often, periphrastic formations with the help of words meaning "make," "do," "put" are used.

[o:ɖippi] < [o:ɖu]
[taɾɖppi] < [taɾɖ]
[ka:ɳbippi] < [ka:ɳbi] < [ka:ɳ]

The last illustrates the [i:re:ɖɪl vɪnɖi] mentioned in the *Nannūl* Sutra.

Telugu. The endings of causal verbs, as seen in modern forms, are *-inchu* and *pinchu*

[ravvintsu] < [var] or [ra] -to come
[tanijintsu] < [taniju] to be satisfied
[ejjintsu] < [ej] to shoot
[pilipintsu] < [pilutsu] to call
[naɖapintsu] < [naɖatsu] to walk.

Besides the above, there are some forms with *p + u* also as in

to communicate [telupu] < [teliyu] to know
to satisfy [tanupu] < [taniju] to satisfy
and a few forms with *chu* only as in

to cause to float [telutsu] < [telu]
to conceal [da:tsu] < [da:gu]
to hang [tu:tsu] < [tu:gu].

All these forms will be explained below. One feature that deserves notice in the above instances is that, generally speaking, Telugu shows *inchu* in cases where Tamil shows *vi* or *bi*, and *pinchu* where Tamil shows *ppikkɖ*. It will be shown below that there is, as this fact indeed suggests, no fundamental difference between the Tamil and Telugu forms and that the few changes that we do see are explicable on phonological grounds.

Canarese. Caldwell's statement that *isu* is the causal formative for all forms in Canarese is too summary an observation, as we shall have occasion to show below.

[nuɖiji ʃu] < [nuɖi]
[naɖɖiji ʃu] < [naɖɖ] to walk
[kuɖiji ʃu] < [kuɖi] to drink
[ma:ɖi ʃu] < [ma:ɖu] to do

Forms with *pu* are also rarely seen.

The main difference between Canarese and Telugu, in the matter of causal formatives, is that the *pinchu* form of Telugu is not represented in Canarese.

Malayalam. Tamil causative forms mostly exist in old Malayalam; but modern Malayalam shows certain characteristic phonological developments.

(a) The *vi* forms, for instance, are replaced in modern Malayalam by the *ppi* forms or altered into *i-* forms. (See below).

(b) The *bi* affix of Tamil, coming in the proximity of nasals as in [ka:ɳbi], [timbi], has changed into *mi* by nasal assimilation, a characteristic feature of Malayalam, e.g.,

[ka:ɳbikkæ:n] > [ka:ɳmikkæ:n]
> [ka:ɳikkæ:n]

(c) The causal forms of verb-roots with vocalic endings show peculiar phonological changes, e.g.,

kaɭɖi + vi + kkjunnu → kaɭɖjikkjunnu
(causes to lose)
(old Malayalam) (mod. Mal.)

(d) Verb-roots with the semi-vowel [j] coalesce with the formative:

uɭɖj + vi + kkjunnu > uɭɖjikkjunnu
(causes to break)

(e) The same euphonic harmony of sounds brings about the change in other instances too, e.g.,

o:ɭu + vi + kkjunnu > o:ɭikkjunnu
(causes to run)

(f) Certain causals show both full and curtailed forms, the former in the literary dialect and the latter in the colloquial:

[viɭu] → [viɭuvikkja] → [viɭikkja]
(literary) (to cause to separate)

INTER-RELATIONSHIPS.

Let us now consider the relationships existing as amongst the various forms of the same dialect and the affinities as amongst the forms of the different dialects. First, we shall consider the formative affixes of each of the dialects separately and establish their connection.

The *vi*, *bi*, *ppi* forms of Tamil are all related together, the differences being due only to phonological influences exerted by proximate sounds.

In Telugu, we have two groups of endings, essentially: *inchu* and *pinchu*. The latter exactly corresponds to the Tamil *ppikkɖ*, the doubling being a Tamil peculiarity and the nasal + palatal *chu* being the Telugu development of Tamil *kkɖ*. We have next to explain the origin of *inchu*. Caldwell is of opinion that this is not related to *pinchu*. That Caldwell's opinion is not justified will be evident from the fact (illustrated in the instances given above) that Telugu always shows *inchu* where the corresponding Tamil words have *vikkɖ*. The change from *vi* to *i* is easily explained:

[ʃejvi] > [ʃejji]

In fact, in the Tamil colloquial and in Malayalam, such a change in the causal ending is common as shown by the following examples:

Mal. [ʃejvikkæ] > [ʃejjikkæ]
to cause to do

Mal. [paɾavikkæ] > [paɾɖjikkæ]
to cause to speak

Mal. [viɖuvikkæ] > [viɖikkæ]
to cause to fall

It is the result, then, of such a sound change that has given us the *i* in Telugu causal forms; this view is confirmed by the

fact that the *i* comes in ONLY in cases where the corresponding Tamil forms have *vi*.

The Telugu forms like

to wet [taḍupu] < [taḍiju],

to satisfy [tanupu] < [taniju], and

to communicate [teliju] < [teliju]

distinctly show the causal suffix *P* which is so common in Tamil. These causal forms alternate with the other *i*-forms also in some cases, e.g., [tanijintsu] and [tanipu].

So far as Canarese is concerned, it is the *i*-forms that are common though there are also a few *pu* varieties (as in Telugu) which, however are extremely rare.

Now, if the Canarese causals are closely examined, it will be seen that the *i*-affix is only the generalised resultant of a phonological change exactly similar to that which has given rise to Telugu, Malayalam and Tamil *i* of the causal verbs mentioned above.

[nuḍi + vi + ſu] > [nuḍiji ſu]

[maḍu + vi + ſu] > [ma : ḍui ſu] > [ma : ḍi ſu]

etc. etc.

There are two points in Canarese which shed interesting light on the formation of the causal. The change of *vi* into *i* is illustrated in cases like the second person plural of the future tense :

[ma : ḍuviri] > [ma : ḍiri].

Another interesting point is that the Canarese future form fights shy of *b* and *pp*, and uses only *v*.

The Canarese formative also, therefore, can be traced originally to *vi*.

The only difference between Telugu and Canarese in this respect appears to be that while in Canarese the *i*-form became general-

ised, in Telugu the *pi*-form was retained in all those circumstances where Tamil demands *pi*.

The Malayalam forms have already been explained, and they require no further comment.

Which is the basic formative affix ?

Caldwell holds the view that the *vi*, *bi*, *ppi*-group of endings is not directly related to the *i*-form which appears partly in Telugu and wholly in Canarese. He further says that the *vi*, *bi*, *ppi* should be related to the future tense-signs which are also seen in one class of Dravidian abstract verbal nouns. According to Caldwell, the causals with *vi*, *bi*, *ppi* are formed from these abstract nouns with the addition of *i* which alone, according to Caldwell, is the true causal particle. The addition of the causal particles in all cases in Canarese and in some cases in Telugu directly to the verbal root would appear, in Caldwell's view, to indicate "an older and simpler period of speech." Caldwell also seeks to explain the origin of *what he calls true causal particle -i* by relating it to the root *i*, to give.

As the foregoing discussion will already have shown, there are several considerations militating against Caldwell's views. They are :—

(a) That, as the *i* appears in Telugu causals in all those circumstances where Tamil has *vi*, it should be more natural to consider *i* as the phonologically reduced form of *vi* itself, especially when we note that an exactly similar change of *vi* to *i* definitely takes place in Malayalam and in Tamil colloquial and further that Telugu has only *pi* forms in all those circumstances where Tamil has *pi*.

(b) That if the *i*-affix were an independent formative representing an older period of Dravidian as Caldwell makes it out to be, it is curious why it should have disappeared so completely from Tamil and appeared in Telugu only in those cases the corresponding forms of which in Tamil have *vi*.

(c) That even the Canarese formative can be related to *vi*, (as we have shown above just in the same way as the *i* of certain Malayalam causals is definitively allied to *vi*).

If then we accept the view that all these causal formatives are closely related, the source or base would be seen to be *vi*, as the foregoing discussion will have shown; *bi*, *pi* and *i* are the forms of the affix resulting from phonetic assimilation and elimination when in combination with other sounds :—

—nasal + *vi* gives rise to *bi*, e.g.

[Ka : ŋbi] ;

guttural + *vi* → *pi* or *ppi* ;

and euphonic assimilation in various circumstances results in *i* as shown above.

ORIGIN OF THE FORMATIVE AFFIX.

If therefore *vi* is the source of all causal formatives in Dravidian, what is its origin? A satisfactory answer can be given to this question also. There is an elementary verb-root in Dravidian which appears in Tamil as [vai], in Telugu as [ve], in Canarese as [bai] and in Malayalam as [və]. The meaning of this root is *to place* or *to set*. That this root has undoubtedly the power of inducing the causative force, when combined with roots, is more or less clear from modern usages like

[varə vai] *cause him to come*, etc., though of course the construction of [varə] in such phrases is gerundive. The causal formative *vi*, then, is in all likelihood only the unaccented form of [vei], the loss of accent being evidenced through the reduction of [vei] into [ve]—a change which is actually active to-day in Malayalam and in Tamil colloquial wherein unaccented positions [vei] easily becomes [vi]. It is this same [vei] that accounts for the formative affix of verbal nouns like [naḍeve], etc., in Tamil and [naḍapu], etc., in Telugu, Canarese and Malayalam.

vei	
↓	↓
any verbal root + verbal-idea of <i>vei</i> = causal verb.	any verbal root + noun-idea of <i>vei</i> = abstract noun.

CONCLUSION.

The following conclusions therefore arise from the foregoing discussion :

(1) That amongst the Dravidian causal verbs, the first class mentioned above (the derived transitives) may be postulated to be the more ancient ;

(2) that the causal formative operating in the second class of causal verbs is fundamentally the same in all Dravidian dialects i.e., *vi*, which assumes various forms and undergoes various phonological changes in the different dialects ;

(3) and finally that the origin of this *i* could be traced to the elementary Dravidian root *vei* (to place).

MATHEMATICS AND IMAGINATION

By

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IT is a commonly prevalent opinion that a mathematician is generally lacking in imagination and æsthetic sense. Some educationists have even openly declared that, as an educative agent, mathematics is impotent to develop finer emotions and heroic sentiments in the pupils.

In defence of these charges, it is sometimes pleaded that the mathematician dispenses with æsthetic creation so that he may preserve the purely logical character of his ideas. This is a wrong plea. In fact, the mathematician, more than any one else, has the gift in him to discover and value symmetry, beauty, simplicity and elegance not only in the concrete geometrical and architectural designs and patterns, but also in the compact exposition of mathematical, nay, natural laws. To him first appeals the beauty of form either of a physical object or of a process of thought, and he labours hard at the refinement and polish of the tools of creative reasoning. He hates a bundle of cumbrous, it may be, overlapping and redundant hypotheses and never spares any pains to clear the superfluous and the irrelevant and select the simplest and the minimum number of thought-units for his starting point.

The mental attitude of the pure mathematician, like that of the true artist, is not utilitarian. He ponders about his subject and develops it for its own sake without any other end in view. The other scientists step in to utilise his results or apply to him for a solution of their mathematical difficulties,

which he then begins to tackle not for their sake but in a pure disinterested mathematical spirit. What is strange and remarkable is that the mathematician, in his enthusiasm, if he is successful, oversteps the limits of his colleague, the scientist, and discovers further generalisations and extensions of his mathematical theory. In fact he sometimes bewilders the other person with more than what he needs for his purpose. For the mathematician, the pleasure that he derives from his work is the only reward that he expects and gets.

The mathematician in his artistic fervour disdains to make his theme provincial and thus to narrow its scope and correspondingly its range of applicability. His ideal is to devise methods and results which are of universal application, whatever be the subject-matter of thought to which mathematical assistance is necessary and however varied its nature. Witness the numerous applications in every branch of knowledge of the newly developed mathematical Theory of Statistics.

The kind of imagination required in mathematics is a very peculiar one. We may call it 'transcendental.' While, in other branches of knowledge, imagination has a physical or sensuous basis, in mathematics there is no such ground needed to stand upon. So to speak, the mathematician begins to build in mid-air, and the construction proceeds both upwards and downwards. For instance, to all lay minds, it is a perfectly accepted sensuous phenomenon that a straight line cutting two parallel straight lines makes equal angles with them. But to the mathematician it is a matter of doubt and he does not see any logically essential reason for it to be so, and hence he denies it and proceeds to build

on a contrary hypothesis. Strangely enough, he succeeds in it wonderfully.

The chief reason why the pure mathematician's imagination and æsthetic sense are not so much in evidence to the layman, as those of a poet or a philosopher, is that he is too much of a riddle to others, working, as he does, behind the screen of his symbols whose apparently mysterious depths baffle the comprehension of the mentally indolent, while the credit which is really the mathematician's due, easily passes off to the astronomer, the engineer, the physicist, the electrician and a host of others who can show some concrete things easily appealing to the superficial tastes of the man in the street. In the unwelcomeness of mathematics and the truths of mathematics to the ordinary man, one may note the counterpart of the unwelcomeness of the first revelations of the great truths of nature. Witness the great sacrifice of Galileo who had been obliged to write "with his own trembling hand a great falsehood and abjure the opinion that the earth moves and that the sun is the centre of its motion, binding himself and swearing to regard it as false." What a heavy price for one's imagination!

The great intellectual sympathy among the greatest poets and the greatest mathematicians is something remarkable and perhaps suggests a sort of kinship between the two apparently diverging fields of imagination in which the poet and the mathematician severally work. Did not Milton pine to hear of his young contemporary, the great mathematician at Cambridge, Newton, and take pride in having actually spoken to Newton's forerunner in the science of the Heavens, the great Galileo? The mathematician is also a seer and a prophet and surely with the lamp of

knowledge he lights, our little planet is fast becoming an Earthly Paradise. To realise the full force of this remark, we have only to think for a moment what the result would have been if mathematics had ceased to progress four centuries ago. All the modern inventions would then have become impossible and our present civilisation no more realisable than a fantastic dream.

It has been truly said that 'the basis of the operations of Nature is Anatomy, Physics and Mathematics.' Otherwise, why should Nature arrange the leaves of plants in a Fibonacci series, why should the structure of the snow-crystal recognise the complex sixth roots of unity, or again the planets revolve in a conic section?

Can it be a mere fortuitous circumstance that the great truths of Nature have been generally revealed first to a mathematician? The founder of the Science of Medicine and rational Physiology was a Professor of Mathematics in the University of Pisa, Alfonso Borelli. His hypotheses about the nature of the processes which take place in the nerves and the mechanism of voluntary movements are yet to be superseded. The great Persian poet and philosopher Omar Khayyám was an algebraist who made an attempt, for the first time, of a systematic classification of equations. Descartes, the inventor of Analytical Geometry and probably also of Calculus, founded a great School of Philosophy. The greatest of Greek thinkers, Aristotle, was a mathematician who was the first to represent unknown quantities by letters and suggest the theory of combinations. Roger Bacon, a pioneer in the Natural Sciences, was far in advance of his times in Mathematics and Astronomy. The forerunner

of modern aviation, the man who was the first to explain the mechanism of the flying machine was a great mathematician, Leonardo da Vinci, whose high artistic powers have found greater recognition than his mathematical talents. These examples point the moral that mathematical training is fruitful in researches in several widely different fields of knowledge. Mathematics is the one science which teaches you how to think and which can light up the path of true knowledge. Beside it, all the other sciences are like empty empiricisms and dignified quackery.

Of one undeniable merit of poetry, Voltaire has remarked that it says certain things in fewer words than prose. This remark is better fitting to mathematics which uses the greatest possible economy in expression. A great teacher of mathematics says: "If 'poetry is unfallen speech,' then geometry is undebased thought and if 'architecture is frozen music,' then it is also the 'crystallised science of form.'" It may sound a joke to call a table of logarithms a series of sonnets but it is the real truth if one will take some pains to think and understand.

'Poets are all who love—who feel great truths—and tell them.' The creative outbursts of genius are the same—the forms only are different. A poem and a mathematical formula differ only in their external appearances, while the kernel is absolutely identical in both. Each of them has for its theme the truths of Nature and proceeds to describe them in its own way, one in an ordered system of symbols, the other in an ordered sequence of euphonious words. But the effect is the same on one who understands the symbols or the words. It is not by a mere figure of speech that Euclid's monumental work has been described as an epic of space while

Lagrange's Celestial Mechanics has been called a scientific poem.

Mathematics is 'one of the eternal verities.' Communion with mathematics has the same deepening effect on the soul as when you stand before a mighty handiwork of nature—a huge mountain, a great waterfall, a vast desert, a frozen sheet of land such as the Arctic Archipelago, or the ruins of a once magnificent city. The truths of mathematics have a two-fold eternity, past and future—an eternity that has neither a beginning nor an end. Suppose one attempts to attract the attention of sentient beings in an unknown world like Mars, by means of signals, can there be a more hopeful symbol than the figure of Feurbach's theorem—the nine-point circle touching the four circles tangential to the sides of a triangle? Surely all other symbols such as pictures, letters or search-lights will be of little avail, being so temporal and earthy not probably having their analogues in any other world than ours. But a mathematical truth is universal and holds good not merely here but also in the remote regions of stellar space.

Anyone looking at the starry sky is apt to make a false estimate of the sizes and relative distances of the great celestial bodies which appear to us like the tiny electric lights illuminating a distant city. Mathematics enables one to rate these luminaries at their true worth, and understand what mighty giants they are and in what immeasurable depths of space they are imbedded—enough knowledge to make one feel what an insignificant particle of dust one is in this vast universe. But insignificant and unimportant as one is, mathematics gives one the power to weigh and analyse these gigantic bodies, to pursue them in their flight across space, to know their

substance and even to write their past history. Except for mathematics, the glories of the universe dimly perceived and vaguely comprehended, could have found expression only in wild fantastic legends. Well may Carlyle exclaim: 'Why did not some one teach me the facts of astronomy and make me at home in the starry firmament?'

The history of mathematics tells us that mathematics had its brigin not in the efforts to fulfil such utilitarian motives as measuring lands or counting one's wealth (these came much later) but in the yearning of the human soul to grasp the Infinite and solve the mystery of the Universe. The first mathematicians of the world dreamt of the courses of the stars in the Heavens and correlated them with the susceptibilities of Gods in Heaven. The Brahmans on the banks of the Ganges tackled the irrational numbers which were involved in the construction of altars with the earnest desire to render their sacrifice in all its particulars acceptable to the Gods and to deserve the boons which the Gods confer in return upon faithful and conscientious worshippers.

Even to-day it is the search into the infinite that has led us on to one of the glorious achievements of Mathematics, the Theory of Relativity propounded by Einstein. Properties of the infinite have been extensively studied and the different infinities distinguished, classified, and arranged mathematically. Researches have been carried on into spaces of multi-dimensions and into the various orders of infinity. Points in all spaces and instants in all time have been reckoned and represented in the little symbol 2^{∞} .

Finally, one is tempted to quote a mathematical exposition of the Biblical

saying 'Behold, I show you a mystery', and 'The kingdom of God is within you'—sayings which have a grand parallel in the Vedic Identity 'Tat Tvam Asi.'

'Consider the familiar illustration of the points within a sphere, say of radius 1 inch. For a point $\frac{1}{2}$ inch from the centre on any given line, there is one and only one point in space such that the product of the distances of these two points from the centre is equal to 1, and this is the point on the line 2 inches from the centre. Likewise to a point 10 inches from the centre on any line, there corresponds a point $\frac{1}{10}$ inch from the centre. And in general, for any point that we may select within this little sphere, there is one point and only one in the Universe to correspond to it. Conversely, for any point in the galaxy, which we call the Milky Way, there is one point and only one that corresponds to it within the sphere which I may hold in my hand. There is no point in the whole Universe that has not one corresponding point and only one in some brain cell of each of us.'

And may I add that all the immeasurable infinite corresponds to only one point, *viz.*, the centre of the sphere? Since this argument applies to any other sphere with a different centre, we have the Infinite or God correlated and co-existing with every point in the Universe. Thus mathematics reveals how God is Omnipresent, how He externally geometrizes putting the Finite and the Infinite in multiple perspective.

ANATOLE FRANCE

By

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A NEW favourite with readers of fiction is Anatole France whose fame as a novelist of the first order is fast spreading wherever the English language is spoken and read. In his own country he is already among the illustrious novelists. He was born in the year 1844 in an old book-shop in Paris kept by his father who was an authority on eighteenth-century history. "He was schooled with the lovers of old books, missals and manuscripts; he matriculated amongst old Jewish dealers of curios and objects d'art; he graduated in the great university of life and experience."

He has written about thirty-five volumes of fiction. *Jocasta and the Famished Cat* is his first novel and was published in 1879. From the publication of his book *The Crime of Sylvesta Bounard* in 1881 his fame as a novelist began to be established. In the year 1896, he was honoured by admission into the French Academy.

It may be said in general that though there is no historical background meriting accurate agreement with the personages and movements from the Middle Ages to the eighteenth century, there are pictured vividly in his works aspects of the life of those times, especially Rome in its palmy days, with a sufficiency of detail and clearness of insight to warrant the reader a good peep into the historic monastic institutions, monks and nuns of the times, their wealth and grandeur, intrigues and animosities, the condition of art and painting and philosophical disquisitions of the days, their superstitions and bigotry,

the prevalent hatred of the Jews, love in all its different kinds and the depravity and immorality of the life led by some of the aristocracy and nobility then. His writings are clearly not for boys but for older men and women.

There is not an aspect of life or human activity on which he has not thrown some light, or given a useful cue which would profit him who would care to know and do the only right thing—on war or love, religious beliefs, social customs, literary pride, etc.,—all these with an overflowing sympathy that wins and surely too, rather than with an assault that shatters and destroys and in it even the good that it seeks to liberate and foster.

If the progress of clandestine love and improper overtures are too well-described, it does not end except in well-merited punishment, the irony of fate as in the case of the love of Dona Maria d'Analos and the Duke d'Andria who met their doom in their love.

The overcoming of temptations which come to man but too often and in great variety, insistence upon charity and the giving of alms as opposed to the thief's repentance or the harlot's weeping, these former alone will gain heaven. "See Nicolas Herli, you are too good neither for Heaven nor Hell. Begone! Go back to Florence! Multiply through the city the loaves you gave last night with your own hand, in the dusk, when no man saw you—and you shall be saved. It is not enough that Heaven open its doors to the thief that repented and the harlot that wept. The mercy of God is infinite, and able to save even a rich man. Do this; multiply the loaves whose weight you see weighing down my balances. Begone!" This is the way to enter the

kingdom of Heaven. * Such practical advice is scattered throughout his works and offers indeed a hand of help to the *ignorant* and the *proud*.

Anatole France is as well a master of humour, not of the cynical or derisive kind but in a purely merry mood yet teaching man the folly of superstition and bad dealing. The futility of blind faith and the degree to which its absurdity would go is ably portrayed in the treatment meted out to Taffi the painter by Merry-hearted Buffalmacco—the lifting to Heaven by rope and pulley. At any rate, this and similar episodes should teach man to keep to fairplay even with one's own servants, and that by one's cloak and hat should not be judged one's deservings.

Love, pure and selfless, is given due praise in the making of life if it is to be worth living. "And he was well aware that Science is vain without Love." Again, "Brother Bonaventure, free my mind of the doubt that is tormenting me, and tell me: can an ignorant man love God with as great love as a learned doctor of the church." And Brother Bonaventure answered, "I will tell you the truth, Fra Giovanni, a poor old woman may not only equal but surpass all the Doctors of Theology in the world. And seeing the whole existence of man lies in loving, I tell you again—the most ignorant women shall be exalted in Heaven above the Doctors"—the same lesson that is conveyed in Theocritus and the Angel or Abou Ben Adhem. "This man I have not been able to tempt by reason of his utter simplicity." Simplicity of life and of spirit, an unruffled faith in love and charity are exalted far above learned disquisitions and are better proof against temptations as in the case of Giovanni. A contempt for the

theological riddles of the Middle Ages is evident from passages like "God was not with him; but He is with the humble and simple-minded. Learn not to will and He will put His will in you. Seek not to guess the riddles of the Beast: Be ignorant and you shall not fear to go astray." "It is only wise men that are deceived." Miracles are not wrought save by faith and love.

In the Revolt of Gentleness (*The Well of St. Claire*) the futility of force—rather its only use is for increasing its evil—and of war likewise—this is brought home to the minds of readers in language that frequently reminds one of the Bible and possesses unexcelled vivacity of style and emotional appeal. One often feels when reading passages like these that the man is himself a hymn to God.

The treatment accorded to poor Giovanni—his arrest, imprisonment and trial are a masterpiece of satire depicting the folly of some of our unbound human institutions which seek to suppress rather than foster the growth of truth and piety, the extinction of individual liberty of thought and action to what we misnomer as the welfare of the state. Here and there his words rise to a height of philosophy and yet of practical application that the afflicted reader will not, as ordinarily, find his troubles and worries aggravated but the ruffled waters of his mind smoothened and a consolation, nay, an encouragement to be of good cheer is proffered forth in abundance to do good to any heart; likewise of the episodes of the maliciousness of fortune and the strokes of unmerited misfortune.

What surprises the reader most is the variety of treat held out even within the confines of one and the same book—the

irony of fate, of life itself, human tragedy, sensualism—even cloying here and there but nevertheless combined invariably with the exalting of virtue and morality. Doubting the powers and wisdom of God is forbidden and we are instructed to commit ourselves to His grace.

“His work is illuminated with style, scholarship and psychology, but its outstanding features are the lambent wit, the gay mockery, the genial irony with which he touches every subject he treats. Yet the wit is never malicious, the mockery never derisive, the irony never barbed. Often he shows how humanity triumphs over mere asceticism; indeed he might be described as an ascetic overflowing with humanity. He is in turn saintly and Rabelaisian, yet without incongruity.” To read his works is a liberal education—a queer blend of ironist, delicate sensualist, sceptic, connoisseur, defender of the poor and genuine humanitarian as he is, his works will well repay study.

KALIDASA

Being a critical appreciation of his works

IN TAMIL

By K. S. RAMASWAMI SASTRIAR, B.A., B.L.

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NUMBER TEACHING BY LIFE AND FOR LIFE.

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• INTRODUCTION.

THIS is an age of reason and scientific advancement. Education itself is looked upon more as a science than an art. The method of imparting instruction has to be in keeping with the spirit of the age, and the talents of the country are not wanting to evolve a system of education suited to the age. But all of us have to take note of the present situation especially of the deterioration in the attainments of school-going children and bestow much careful thought on finding a way to rectify these defects and place the system of education on a true, scientific and workable basis.

There is no royal road to knowledge. Shall we then lay no faith in any of the methods talked of at present, *viz.*, ‘The Dalton Plan’ or ‘The Project Method?’ I believe they have been the outcome of the earnest efforts of certain teachers to solve particular problems that confronted them at that particular period. Therefore the methods in vogue are not the only best methods for the future also, but more methods are yet to come. A teacher is very often beset with many a great difficulty in the class and he has to find out solutions for overcoming them and also keeping them for future guidance. Any right and earnest endeavour in this direction as a result of mature thinking may be said to be a method of teaching that particular subject.

If we desire to have the best form of teaching, it would be much better and far fairer

too if the methods are taken up sympathetically and with the right attitude to work them up sincerely, adapting the same whenever necessary. They have to be studied well and much effort has to be spent in preparing the right foundation. A training to the child on right and rational lines from early childhood is necessary. I need not say that the school-training is a continuation of the home-training and the latter should have been of the most ideal type possible. It would be too much here to dilate on the topic of home-training. But the whole thing may be summed up thus: We adopt play methods and practical steps where the child learns things for himself, where he takes knowledge easily by working in a laboratory created around him. Therefore the best form of number-training could be given to the child by extending to the school, the play and practical method of the home and providing in the school great facilities for learning by observation, hand-work and seeking help from others. It is a combination of all the best methods. I shall take a few examples from number work and explain the ways by which we could tackle the problem successfully.

At the outset one finds a vast difference especially between the attainments in number-work of a village boy and of a town child. The former has all his fractional tables at his fingers' ends and is quick in memory, while the boy of the town used to his paper and pencil looks rather handicapped. This has been very often noticed by all of us and this itself is a proof positive to condemn the modern methods. We all fail to realise the mode of approach to knowledge. In the former case the method was only mechanical repetition after the teacher and the cultivation

of extraordinary memory power which the modern child is sadly lacking in. The modern educational theory lays stress on the self-expression of the child and his capacity to learn for himself by his self-activity as opposed to the idea that he is only a receptacle of information emanating from the teacher's lips. The teacher's duty is therefore to find out suitable exercises for the child in keeping with the knowledge he is to present to the latter and at the same time guide the child in his work. The exercises are also to be graded according to their difficulty. It occurs to me that both the qualities, *viz.*, memory training and practical learning, are two great essentials for training in number-work.

I THE FOUR SIMPLE RULES.

I have said enough on the teaching of the four simple rules and the Polar Pallan guzhi or the Number Board which I have devised and described in a previous issue would be valuable material for teaching the same. An illustration of the same appears in the April issue. Herein I have to make one or two observations concerning the same being the experiences of close contact with children. Methods are the outcome of the earnest efforts to solve certain difficulties and the little that I say should be viewed only in this light.

At the beginning of each year the children should have short oral tests on the four simple rules on the model suggested in the *Educational Review*. This gives us an idea of both speed and accuracy. We are able to locate the exact point where children err, find great difficulty and require guidance. We can see how many children even in the high classes use their fingers in counting. This reveals the condition of their memory power etc.

(a) Addition.

i. Importance of showing to children quicker ways and shortened methods of oral calculation in addition and subtraction.

26 + 9 = 36 - 1 = 35
19 + 6 = 20 + 5 = 25
67 + 28 = 87 + 8 = 95

All these will minimise the practice of resorting to fingers.

(b). Subtraction.

63 - 28 = 63 - 20 = 43
43 - 8 = 35 } or 28 + 2 = 30
30 + 33 = 63. Ans. 35.

WRITTEN WORK.

	H.	T.	U.
Steps ...	6	9	14
	6	10	4
Sum ...	7	0	4
	4	8	6
Answer ...	2	1	8

A

H.	T.	U.
7	0	13
7	10	3
8	1	3
4	0	5

B

H.	T.	U.
8	17	9
9	7	9
4	8	4

C.

Children in the lower classes when doing subtraction should be compelled to write in the manner suggested above. Children should be made to see, when following the borrowing method in subtraction, that they ought to borrow when the digit in the lower column is greater than the one in the same place in the upper column.

ii. Children should be taught to verify their results after subtraction. In A, 486 + 218 gives 764.

iii. This will enable children to perceive the value of the addition method in subtraction.

α. 70 - 43 = 43 + 7 = 50; 50 + 20 = 70: Ans. 27.
or 43 + 20 = 63; 63 + 7 = 70: Ans. 27.
(b). 42 - 18 = 18 + 2 = 20; 20 + 20 = 40; 40 + 2 = 42
18 + 10 + 10 = 38; 38 + 4 = 42; Ans. 24.

(c). Multiplication.

In doing Multiplication, children often err in not beginning to write the partial product in the proper place. The place value

of each digit in a given number should be taught clearly and especially the place for a zero in any number has to be emphasised. So, when in the beginning the children are doing Multiplication, I would lay emphasis on the method of working in columnar form

A.

T.Lks.	Lks.	T.Th.	Th.	H.	T.	U.
					1	8 ×
					2	2 0
					↓	↓

B.

				4	8	6	4
					5	0	7
					↓	↓	

In the next stage, they should be shown the other method of multiplying, first starting from the number in the highest place.

18
220
= 2 hundred times
= 2 ten times. II.
= 220 times.

Let them see I and II side by side and learn the value of each method.

(d) Division.

I. ORAL WORK.

Division is sharing or distributing. When a given quantity is to be equally distributed among a given number of persons, the quantity received will be much smaller than the quantity on hand and hence the children will have to apply the rule of Division and not Multiplication.

There is another process involved. If the things are distributed at a certain rate to each, the number of persons receiving the same can be neither equal to the quantity on hand and still less much above it. The following examples will reveal the laws clearly :--

- i. 7 days a week. 63 days. No. of weeks.
- ii. 5 drum-sticks in a bundle. 35 drum-sticks. No. of bundles.
- iii. 6 fruits per anna. 54 fruits. Cost in No. of annas.
- iv. 9 chairs. 63 rupees. Cost of one.
- v. 8 rows of brinjal seedlings. 56 seedlings. No. of rows.
- vi. 4 heaps of guava. 20 fruits. No. in each heap.

From the beginning when oral work is connected with written work, the teacher may show these examples and work them up on

the black-board so that gradually children can definitely understand the nature of problems which are to be solved by the law of division and those exactly which are to be solved by multiplication. No doubt children who have the tables at their fingers' end will readily give out the answer; but if asked as to the method by which they arrive at the answer, they are not exact in their statement, whether it is by division or multiplication. The above practice of working the oral sums in the manner suggested will clear the misconception, if any.

II. WRITTEN WORK.

- i. Before attempting to divide one number by another number, pupils must first and foremost ascertain the number of digits that would find a place in the quotient. Here too the cypher puzzle creeps in.
- ii. On no account should the remainder be higher than the divisor.
- iii. Having added a digit from the dividend to the partial remainder, save when the same number cannot be divided by the divisor, a zero ought to find a place in the quotient so as to make up the total number of digits as originally fixed.
- iv. A zero from the dividend must never be ignored from itself or in adding it to the partial remainder.
- v. Always fix up the exact number that would divide the partial remainder.

47)5105(10	47)5105(18
47	47
45	405
Zero from the dividend ignored	376
	Tens column in the quotient ignored

47)5105(1071 The exact number that 47 would divide
405 is not 71 but 7 + 1 or 8.

47
—
405
329
—
76
47

Example 2.
3)2145(7015 How did this 0 in the quotient creep
in? Because there was a zero in the
partial remainder
21
—
21
—
0 and hence a zero in the quotient
also.

Such wonderful mistakes creep in and I am
sure when the foundation is strong and when
we take into our consideration the actual
difficulties experienced in the higher classes,
we could certainly devise means or take steps
to see that children entertain no such mis-
conceptions from the beginning.

III. SOME DIVISION PROBLEMS.
Example:—Find the dividend when the
quotient is 26, divisor 24 and remainder 16.

Before we give this sum as it is, we must give
children a number of oral problems involving
the same principles contained in the said
question and show to children the method of
arriving at the correct answer in written
work. Incidentally we can also teach them
a sign by which they could remember the
method at any time.

Oral example: 6) Total number (Rs. 8 each.
of chairs of Rupees.
+
Rs. 2 remainder.
×
Total number of (6 chairs.
Rupees
+
Rs. 2 remainder.

×
The sign exactly shows, multiply the
divisor and the quotient or vice versa and
+
add the remainder to the product.

IV. MONEY PROBLEMS.

It is always argued that in teaching these
problems actual and living problems connected
with life's experience should be given to
children in order to give a realistic colour
to the teaching and make the lessons im-
pressive. How shall we provide all life's
experiences connected with money problems
during the short period of the children's stay
at school and when especially their minds are
not well matured? If we really are in earnest
about the problem we could certainly bring
about a change in the drudgery of the school
atmosphere by means of charts, stamp-
albums, ready-reckoners, and token or actual
coins and opening an actual book-shop in the
school on a co-operative basis. I shall speak
about each of these in some detail.

Children always go wrong in reducing
to pies a given number of Rupees, annas and
pies.

Rs. a. p.
4 12 6
16
—
Annas 64 + 12
—
" 76 × 12
—
Pies 912 + 6
—
Pies 918

At the beginning of teaching reduction, the
arrow-marks should actually be shown on the
black-board and for a time the children could
be asked to mark these arrows as well in
their note-books so that they may remember
to add these after multiplying Rs. by 16 and
As. by 12.

We may also tell them that birds of a
feather flock together, annas always go with
annas and pies always with pies and hence

they should never forget to take their re-
spective companions annas and pies waiting
in the given sum. This method may avert
the common error of overlooking these figures
altogether. What applies to the reduction of
money applies equally well to the reduction of
other quantities also.

STAMP COLLECTION AND NUMBER TEACHING.

This is a most convenient and useful chart
that could be got for the class and in getting

up the chart both the teacher and the children
can co-operate. The children can help in
bringing old stamps and pasting them in the
places and in the order marked out by the
teacher. How valuable to the teacher are those
old stamps so loosely scattered in the dust
heap! Only teachers can realise their use.

In the course of the enthusiasm displayed
in the making of the chart, they would have
learnt a number of money relationships.

STAMP COLLECTION AND NUMBER TEACHING.

No.	1	2	3	4	5	6	7
	Quarter-anna.	Half-anna.	One Anna.	Two Annas.	Four Annas.	Eight Annas.	
1							
2							
3							
4				*	*		
5							
6				*			
7							
8				*	*	*	
9							
10				*			
11							
12				*	*		
13							
14				*			
15							
16				*	*	*	
	64 Quarter-annas.	32 Half-annas.	16 One annas.	8 Two annas.	4 Four annas.	2 Eight annas.	One Rupee.

Column 1 is sub-divided into 4 parts and 4
quarter-anna stamps are fixed there. It clearly
shows that 16 lines of this sort, 16 rows of 4
quarter-anna stamps or 16 annas make a
Rupee. In the same manner two half-anna
stamps are fixed in the first line in column 2,
and other stamps in the portion marked out

- THE VALUE OF THE CHART.
1. Simple fractions of a Rupee are learnt,
e.g., $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, $\frac{1}{16}$.
 2. The relation of one part to the other is
concretely learnt.

by dots excepting one anna where one one-

3. If we ask the value of 21 quarter-annas, the children can readily say five annas and three pies; but when they work it on slates or paper they make this mistake.

A		B.	
8 46	Two-anna pieces.	4 22	quarter-annas
Rs. 5 — 3 annas		5 — 2 pies, instead	
instead of 3 two-anna pieces or 6 annas;		of 2 quarter-annas or 6 pies.	

The stamps provide a very good example in this respect. In A the remainder 3 is three two-anna stamps the value of which is annas six and not three, and in B the value of two is not two pies but 2 quarter-annas or six pies. So by associating these coins with a definite object they know, we give a concrete shape to ideas of number and minimise any misunderstanding that they entertain.

4. The children could exchange one stamp of a higher value to stamps of a lower value and thus play a game of post office or buying and selling stamps.

5. Even young children could be asked to collect these, sort them according to colours, and learn the value from the numbers seen on the stamps. When once their curiosity is roused and when they see the teacher's enthusiasm over it, they will readily respond to the right lead given in the most admirable manner.

6 (a) Apart from this chart, the teacher could have another note-book wherein he could be going on collecting these old stamps at least for about five rupees in each kind.

(b) Boys themselves can form into groups and prepare similar charts if stamps are easily available.

7. When the money relationships are learnt, they could be arranged in the order shown here. Usually we write

12 pies = 1 Anna,
16 annas = 1 Rupee.

But in one of the old books a form on the following lines was indicated and this is only an adaptation, but all the same very useful

Tables at a Glance: Money: A.

Rupee	1/2 Re.	1/4 Re.	1/8 Re.	1 Anna	1/2 Anna	1/4 Anna	Pies
1	2	4	8	16	32	64	192
	1	2	4	8	16	32	96
		1	2	4	8	16	48
			1	2	4	8	24
				1	2	4	12
					1	2	6
						1	3
							1

I is based on the relationships arrived from the use of the stamp album, the last column pies being excepted which is learnt both actually and by applying the Multiplication Tables.

Similarly all Tables in Arithmetic can be written on these lines. I give one more specimen below. Though it has no immediate connection with money problems, it has a great connection with the Bookshop I am going to describe.

II.

Rupee	Annas	Pies
1	16	192
	1	12
		1

B. Paper.

Bale	Reams	Quires	Sheets
1	10	200	4800
	1	20	480
		1	24
			1

Gross	Dozen	Unit
1	12	144
	1	12
		1

READY ORAL CALCULATION IN MONEY PROBLEMS.

At the completion of the school course, we expect the children to have ready solutions to simple problems at their fingers' ends. Plenty of exercises ought to have been given towards the achievement of this end. I give below two charts:

I. Fractional parts of a Rupee. A.

For a Rupee	3	6	12 things.
Cost of	1 0 5 4	0 2 8	0 1 4
2	0 10 8	0 5 4	0 2 8
3		0 8 0	0 4 0
4		0 10 8	0 5 4
5		0 13 4	0 6 8
6			0 8 0
7			0 9 4
8			0 10 8
9			0 12 0
10			0 13 4
11			0 14 8

B.

For a Rupee	24	32	48	64	96	things
Cost of	10 0 8	0 0 6	0 0 4	0 6 3	0 0 2	
	10 0 6 8					
	12 0 8 0					
	16 0 10 8					
	20 0 13 4					

II. The Boys' Ready-Reckoner. A.

Cost of 12 things.	1 Anna	2 As	7 As.	8 As.	14 As.
Cost of	1 0 0 1	0 0 2	0 0 7	0 0 11	0 1 2
2			0 1 2		
3			0 1 9		
4			0 2 4		
5			0 2 11		
6			0 3 6		
7			0 4 1		
8			0 4 8		
9			6 5 3		
10			0 5 10		
11			0 6 5		

B.

Cost of 16 things	1 Rupee	2 Rs.	0 4 0	0 8 0	0 12 0	1 4 0	2 8 0	3 12 0
Cost of	1 0 1 0	0 2 0	0 0 3	0 0 6	0 0 9	0 1 3	0 2 6	0 3 9
2					0 1 6			
3					0 2 3			
4					0 3 0			
5					0 3 9			
6					0 4 6			
7					0 5 3			
8					0 6 0			
9					0 6 9			
10					0 7 6			
11					0 8 3			
12					0 9 0			
13					0 9 9			
14					0 10 6			
15					0 11 3			

In the charts, 'Fractional parts of a Rupee: A and B,' I have omitted the parts 1/2, 1/4, 1/8, 1/16 since they have been dealt with on Stamp Collection and Number Teaching. Moreover the lesson on fractions will surely take much of their time in learning about these simple fractions in greater detail. This

lesson I reserve as the next topic in this article.

In the Boys' Ready Reckoner: A and B, I have indicated only one exercise done by the teacher and the boys. I would suggest that more drill exercises of the type may be set for children. The same indication is also

suggested in Fractional Parts of a Rupee: B. There too I have fixed the number of articles as 1, 10, 12, 16, 20.

Articles

1. It is always necessary to know the value of one so that one could readily say the value of any number of articles from 1 to 10.
10. This is to find the value of the number of articles numbering in tens.
12. To find the value of a number of articles numbering in dozens.
16. } Mere Drill Exercises.
20. }

More numbers of articles can accordingly be chosen and the children can be asked to find their values as well. Some of the lessons on fractions which I show later on will have to be applied even in the above lessons.

THE VALUE OF CHARTS.

The making of these charts does not involve any expenditure of money, but only labour. Considerable thought has also to be spent on the making of these charts to the requirements of the children of the school. I have made free use of numbers from calendar sheets in big and small types so as to make these attractive and to be of a permanent nature in the school for use in successive years. Only the teacher who appreciates the value of these charts can see the use of these old calendar sheets. The children can be asked to bring as many old ones as they can.

The hanging of these charts in the class itself would provide the natural inducement for learning. When a particular topic is taken, the chart or charts relating to that particular topic may be exhibited in the class-room for a sufficiently long time and thus the mathematics class would itself look like a laboratory for the children's observation, experiment and inference. It is advantageous also to make the children attempt these charts for themselves individually or in groups. The service of the hand enriches the mind. It is not to be believed that practical work is overdone.

These also suggest as to how we can give home-work to children and keep them engaged during their leisure hours at home. Our charts will serve as a model to children. It is however left to the teachers themselves to consider which are essential. I have merely suggested all the possible ways of enabling children to find things for themselves by observation, experiment and inference.

THE SCHOOL BOOKSHOP.

If there is any one who realises the value of co-operation, it is the teacher; if there is any place where it is really to be sown and made to grow, it is the school. It will be quite easy to open a bookshop on a co-operative basis within the school and I am sure when it is once started under good auspices and worked on right lines, it will grow prosperous to the advantage of the pupils, the teachers, the school, and the village as a whole, and this will show a splendid report about itself to the on-lookers.

I shall indicate a few details on which it should be worked and then suggest how it will aid our Number-teaching. Elementary school teachers residing within a radius of two miles can form a group, and fix a central place for themselves to carry on the regular work of the Book depot. That will be the head-quarters and several other places will form its branches. Each of the teachers can advance some amount up to Rs. 5 each just before the commencement of the school year and have in ready stock books and stationery which will be sufficient to meet the first and eager demands of the pupils. They could also arrange to start this as soon as they receive the grants. I need not remind the teachers that the book-sellers do give a certain percentage of commission when the concern is run with strict economy and clear forethought as to probable expenses, we can surely make it a permanent and profitable institution. Very soon we could realise our capital and afterwards we can run it with the little profit that accrues to us. With the profit itself as the capital, the next year's purchases can be made so that the teacher will not look upon it as drawing out money from his already depleted purse.

(To be continued.)

INDIA THROUGH THE AGES.

ON the invitation of the Madras University Dr. Jadu Nath Sircar delivered on the 6th March and succeeding days the first set of lectures under the terms of Sir William Meyer's Endowment Fund. The lecturer presented a general view of the history of Indian culture through the Ages. The first dealt with the contribution of the Aryans to Indian culture. He found that the Aryans inspired the people with the spirit of systematising thought, taught them to exercise their imagination without extravagant grotesqueness or emotional abandon. The next great factor in the growth of Indian culture was Buddhism. Gautama and his followers presented to the masses a simple ethical code. They also introduced into the country idolatry and the monastic system of the organization of religious devotees. The last gift of Buddhism was the establishment of intimate contact of India with foreign countries. This brought foreign settlers to India who gradually received the Indian stamp. Hence arose the synthesis called Hinduism, which ousted Buddhism from the land of its birth. This was facilitated by the fact that the philosophy of Buddhism was merely the continuation of older Hindu philosophy and Buddha left no ritual behind him, which specially marked his religion as a distinctive one.

Another cause of the death of Buddhism in India was the accumulation of wealth in monasteries and the leisurely over-elaboration of philosophy among the monks. Neo-Hinduism was able to assimilate the teachings of Buddhism, including its Tantras. The final death-blow to Buddhism was given by

the Muslim conquest of North India in the 13th century.

The Muslim conquest of India differed from preceding invasions in that the rigid monotheism of Islam could not compromise with Hindu polytheism. Moreover the Muslim element in India preserved for a long time its military character. The gifts of the Muslim age to India was the revival of the Indian navy, and the facility afforded for the establishment of Ramananda's sect, the rise of a voluminous historical literature, and the use of gunpowder in warfare.

The next milestone in the progress of India was the arrival of Europeans. The Portuguese were the first in the field, who however created a strong feeling of repulsion in Indian minds. The Renaissance of Indian life in recent times is entirely the work of the English. The first gift of the English to India was universal peace; the next was the restoration of India's contact with the rest of the world. The next gift was the stimulation of the spirit of progress; but the greatest gift of all was the intellectual awakening due to the study of English Literature. As a result of this the vernacular languages have been wonderfully developed; the Indian drama has been completely transformed; a new spirit of patriotism has been created. But the greatest result of the Renaissance has been the birth of social reform. Religious reform, like the organisation of Brahm Samaj has also followed; and finally political agitation has come to stay in the country. This will prove beneficial only if the Indian people give up the dream of isolation and standardise and come into line with the living world outside, or the nation will become extinct.

Reviews and Notices.

A BRIEF ACCOUNT OF MALAYALAM PHONETICS, BY
L. V. RAMASWAMY IYER, M.A., B.L., MAHA-
RAJA'S COLLEGE, ERNAKULAM, COCHIN STATE
(BEING CALCUTTA UNIVERSITY PHONETIC
STUDIES: NO. 1), EDITED BY PROF. S. K.
CHATTERJI, M.A., D. LITT.

This short monograph is probably the first of its kind in the whole range of Dravidian Linguistic Studies and constitutes undoubtedly the greatest contribution to Malayalam, at least since the publication of Kerala-Pāṇinīyam. Throughout, the author reveals not the dabbling hand of an amateur, but the trained hand of a specialist and here and there strikes a note of genuine individuality and refreshing originality, which spices, as it were, what may be dry study to the general reader. All the sounds of our language are here very carefully described, and that according to the well-recognised I. P. A. Script; and the general remarks, following the description of individual sounds such as those on accent, length and doubling of consonants, etc., add considerably to the usefulness of the work to the scientific student of language. While we cannot help wishing that his general remarks were more profuse so as to better elucidate the neutral sonants and consonants, it can unhesitatingly be said that the book does supply a long-felt want. It may be that the work does not exhaust all kinds of variations in the matter of pronunciation in various areas, but it cannot, indeed, be gainsaid that the author has well succeeded in recording and describing with a very fair degree of accuracy the average standard pronunciation of the cultured Malayalis. Similarly it may also be that one cannot accept some of his views. We cannot, for instance, quite agree with him, when he says that Kerala had in ancient days the same political government as some of the East Coast districts. The origin of *Maṇipravāḍam* we would rather trace not to a sense of pedantry on the part of the Sanskritists, but to a desire to create a hybrid language to suit the weird *Vidvāṅka* of the Sanskrit

dramas, as staged in this little corner of India. Coming to Eḷuttaccan's contribution in the field of language, we would estimate it as consisting mainly in introducing a new outlook regarding the mutual relation of Sanskrit and Malayalam and in adapting the local Sanskrit script for the already Sanskritised local vernacular, and not in creating a new type of language and script. We do not indeed claim any finality for our views and do incline to think that Mr. Iyer may have his own reasons for his views; and in referring to these differences our aim is only to emphasise the fact that a systematic scientific discipline has yet to be introduced into the study of Malayalam, an aspect which makes the present work all the more creditable. The work, we dare say, constitutes a standard record of no mean scientific value, and as such, deserves to occupy a high place amongst similar productions. While, therefore, we have great pleasure to commend the book to the student of languages, we heartily congratulate Mr. Iyer on the successful pioneer work he has done. We cannot better conclude this review than with a request to Mr. Iyer to follow up his 'Phonetics' with a detailed volume on the Phonology of Malayalam from the comparative and historical point of view—a task for which he appears to be eminently fitted on account of his linguistic attainments.

THE JOURNAL OF THE MADRAS GEOGRAPHICAL
ASSOCIATION, VOL. II, ISSUES NOS. 3 and 4.

The first of these numbers contains the paper read by Prof. C. S. Srinivasachariar on 'Stages in the Growth of the City of Madras,' before the Association in August last, along with the numerous foot-notes accompanying it. Two sketch-maps one showing the plan of the siege of Madras by La Bourdonnais in 1746, and the other being a picture of the Fort as it was towards the close of the 17th century are given in the second of the issues as an appendix to the article. The Association will do well to arrange for a thorough exam-

MARCH 1928.]

REVIEWS AND NOTICES.

ination of the growth of each suburb of the city on the same plan and publish a series of prints, sketches and pictures of Old Madras with explanatory notes to each. We hope this suggestion will commend itself to the enterprising authorities of the Association.

Other things of note in the issues deal with the method of imparting instruction to a Third Form boy regarding the observation and collection of data concerning the climate of an area, by Prof. G. W. Watkins; a paper on Sewage and City Geography supplemented by illustrations, read by Mr. N. Swaminathan before the Association; a scheme of regional survey suited for the Fourth Form student; the inaugural address delivered by Mr. C. W. E. Cotton, I.C.S., on Kerala before the Kerala Society; and notes on the progress of Geography studies in the Universities of the Province. We hope the Society will go on with the very good work they have been doing in the matter of the Journal.

INDIAN HISTORICAL READERS. BY JAMES H.
GENSE, S.J.—BOOK III.—ROMANCE IN INDIAN
HISTORY. (MACMILLAN & Co.) Pp. 142.

'Romance in Indian History' is the title of yet another small book by the talented writer, Father J. H. Gense, which forms Book III of Macmillan's Indian Historical Readers. It is not the aim of the author to plough the trodden field of Indian History with long lists of dynastic changes and accounts of battles and sieges. It is not to be either India's cultural history with an account of her social and religious institutions. It is the sole aim of the author to portray the character of the leading heroes in the long drama of Indian History. In this he has eminently succeeded. The various figures are made to live and act before the reader and the details that are given are sufficient to form correct impressions in the mind of the young. Particularly interesting are the pages devoted to the description of the Great Horse Sacrifice in the time of Pushyamitra (end of 2nd century B.C.),

XXXIV—25

p. 14. The thrilling story of Alā-ud-din's Siege of Chitore with all the romantic details concerning his love for Padmini, the wife of Prince Bhimsi, has been told in a manner which few can imitate. Father Gense could have been more generous in his treatment of Sivaji but what he writes about him cannot certainly offend even the most ardent admirer of the great Maharatta hero. Only 16 pages are allotted for the British period and it must be confessed they are dull reading. The book serves as a model in historical composition. Throughout the style is simple and as charming as the stories, Father Gense has selected to develop.

"PEEPS AT THE LEAGUE OF NATIONS," BY HERB
SEAUL. (A. & C. BLACK & Co., LONDON).

AGENTS:—Macmillan & Co., Calcutta, Madras
and Bombay.

Quite a valuable addition has been made to the "Peeps Series" by the additional volume on the "League of Nation."

Beginning with the Dreamers, who dreamed of peace, the King of Bohemia, Louis XI, Henry of Navarre and Grotius, the author takes us through the City of Refuge, the birth-place of the "League of Nations," where the era of "peace on earth to men of goodwill" was made possible, accomodating delegates of the 55 nations in its *Palais de Nations* through the Balkan Theatre at the Cross-road between Europe and Asia comprising Greece, the cradle of Western civilization, and Bulgaria, land of Roses, where however great numbers of unhappy and destitute people have come, bringing with them, poverty, hunger and disease; through Vienna, once capital of a vast Empire, but now of a tiny Republic, where the innocent suffer as result of the war on the disintegration of the Empire, through Poland with a glorious past whose grave wrong has now been righted, through India which has been termed 'The Magic East,' to the Holy Land of Palestine, containing Jerusalem, the sacred city of three great religions, where

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Jews want to settle to begin with, under the protecting wings of the League of Nations.

The concluding chapter on the Citizens of the Empire affords a nice coping stone to the beautiful arch constructed so far in the body of the book.

The volume forms nice reading and may be quite useful as additional book for Intermediate classes in Colleges.

We are asked to publish the following :—

THE MADRAS GEOGRAPHICAL ASSOCIATION.

DETAILS OF THE SUMMER SCHOOL TO BE

HELD IN APRIL 1928.

1. This Summer School has the approval and support of the Director of Public Instruction, Madras.

2. It is primarily intended for graduate teachers of Geography; but, accommodation permitting, a few secondary grade teachers will also be taken. A separate course for secondary teachers will be held later in the year.

3. The classes will be held in the Geography Department of the Teachers' College, Saidapet, from Monday, the 2nd April to Saturday, the 14th April 1928 (both days inclusive).

4. The course will consist of :—

- (i) *Climate and Weather*: by Mr. N. Subrahmanyam, M.A., L.T., Lecturer in Geography, Teachers' College, Saidapet.
- (ii) *Map making and map correlations*: by Mr. G. D. Watkins, B.S., F.R.G.S., Headmaster and Lecturer in Geography, Christian College, and Miss E. D. Birdseye, B.Sc., Dip. in Geo. (London), Lecturer in Geography, St. Christopher's Training College, Madras.
- (iii) *Modelling and use of apparatus*: by Miss E. D. Birdseye.

(iv) *Graphs and Statistics*: by Mr. M. Subrahmanyam, B.A., B.L., Editor, Journal of the Madras Geographical Association.

(v) *Elementary Surveying*: by one of the Instructors in Surveying, Engineering College, Madras.

(vi) Four or five *general lectures*, illustrative of geographical method and viewpoint, e.g., 'Madras as a Regional Study,' by Miss E. D. Birdseye; 'The Geography Room and its Equipment,' by Mr. N. Subrahmanyam; 'Cotton as a world commodity,' by Mr. M. Subrahmanyam.

(Detailed syllabuses will be issued to the selected candidates in due course. They are advised to provide themselves with mathematical instruments boxes).

5. The hours of work will be from 11 A.M. to 1 P.M. and from 2 P.M. to 4 P.M. Surveying will be conducted in two batches, one batch working from 6-30 to 9 A.M. and the other batch from 4 to 6-30 P.M. There will be no regular classes on Good Friday, Easter Sunday and Tamil New Year's Day; but, on those days excursions will be arranged to Pallavaram, Madras Harbour, Observatory, Botanical Gardens, and Ennore backwaters.

6. To meet the cost of stationery, excursions and other incidental charges, a fee of Rs. 10 will be charged for the entire course. This amount should be remitted to the Secretary so as to reach him not later than the 30th instant. Those whose fees are not received by that date cannot have their seats guaranteed.

7. Lodging and Boarding for those that require it will be arranged in the Teachers' College, Saidapet, and the probable expenses will be Rs. 15 for the whole period, payable in advance. Those wishing to stay in the Hostel will remit this amount to the Secretary.

Gopalapuram, } N. SUBRAHMANYAM,
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Duff: College physics.

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Marshall: The Bagh caves in the Gwalior state.

O. Literature.

Magha: Sisupalavadha.
Rajaratna Mudaliar: Siva Potri Thogudi.
Tirugnanasambanda Swamikal: Thevarapathigangal.
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Ramamurthi: A memorandum on modern Telugu.
Gissing: Letters.
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Q. Religion.

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 Dawson : Municipal life and Govt. in Germany.
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 Heatley : Diplomacy and international relations.
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X. Economics.

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 Tamil Lexicon, Vol. II, Pt. 4, and Vol. III, Pt. 1.

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EGMORE, } S. R. RANGANATHAN,
 31st March '28. } Librarian.

The Educational Review.

We congratulate Sir Annamalai Chettiar on the splendid benefaction of twenty lakhs of rupees which he has announced for the inauguration of a unitary and residential University at Chidambaram to be called the Sri Minakshi University. Sir Annamalai has been a generous patron of education for many years and it is due to his generosity that we have to-day in Chidambaram a well-equipped educational institution of the first-grade, catering to the educational needs of a large number of Tamil students. This splendid endowment beats not only his own previous record, but also all other educational endowments of Southern India in present memory. It is evidence not only of a large heart but also of a praiseworthy perception of the greatest need of India to-day. His example is worthy of emulation in all other parts of India, and if we had even a handful of such philanthropists in the country to-day, it would make a mighty difference to the cause of higher education. In view of the fact that Chidambaram is his native town and he has already spent a large sum of money in starting and maintaining a first-grade college at the centre, it is perhaps natural that he should wish for a University to be established there out of his benefaction. While wishing all success to his enterprise, may we point out that the idea of locating the University at Chidambaram is one which is capable of improvement? Its

close proximity to Madras, being only about a hundred and fifty miles distant, is a serious handicap, and students can be induced to come there without going to Madras, only by such attractions as scholarships, free boarding, low fees and so on. Being a big city with a large number of facilities for liberal culture, Madras will continue to attract a large number of young men and it will affect seriously the growth of the prospective University at Chidambaram. Again, Chidambaram is by no means a suitable centre for a University, in spite of its sanctity as a place of pilgrimage. May not Sir Annamalai consider the possibility of using it for a great Tamil University to be located either at Trichinopoly or at Madura, both of which have a better educational atmosphere than Chidambaram? Even from the standpoint of Hindu sanctity, which is apparently a strong consideration in his eyes, they are by no means inferior to Chidambaram, and a University located at one of these centres should appeal equally to Hindu sentiment. We trust the Government of Madras will take prompt advantage of the offer and go forward to take the necessary steps for the establishment of the institution.

The recent annual meeting of the Inter-University Board held at Madras forms another stage in the development of that body and gives evidence of its increasing appreciation by the Universities in India. When the Board was inaugurated in 1925, the

Universities of Calcutta, Lucknow and Allahabad stood out, for reasons best known to themselves, but they have all since joined and the recent meeting held at Madras was the first one at which Allahabad and Lucknow were represented. Even the newly-started Agra University has resolved upon joining the Board, which means, it now commands the confidence of all the Universities in India. Many resolutions of considerable educational importance were passed at the last meeting. The necessity of military training as well as the study of military science claimed special attention. In the first place, it was resolved to approach Government with the request that direct Commissions should be granted to graduates of Indian Universities on the lines of the Commissions granted to graduates at the Universities of Oxford and Cambridge. The Government of India is to be approached to advise the Universities on the matter. It was resolved that a knowledge of the elementary facts of Geography should be insisted upon from every student entering upon University courses and it was also recommended that Universities should consider the introduction of Geography into University courses. The educational possibilities in broadcasting and the use of gramophone records for supplementary language teaching were among the numerous other subjects discussed. It was resolved to obtain information from all the Universities and the Educational departments of the country, regarding the action which has been taken on the use of vernaculars as media of instruction. In view of the imperative duty of Universities to attend to the physical culture of its young men, it was also resolved to collect information on what is being done in the matter from the Universities. As is well-known, the Inter-University Board is already publishing a *Handbook of Indian Universities*, but in the course of the coming year, it is also to issue a Bulletin of news from all the Universities and a pamphlet on the present facilities for Oriental Studies and Research in the country. Prof. A.C. Woolner, M.A., C.I.E., of the Punjab, was elected Chairman of the Board in place of Sir Venkataratnam Naidu, and Prof. P. Seshadri of the Benares Hindu University was re-appointed Secretary for a further period of two years, a special resolution appreciating his services having also been passed at the meeting. A special feature of the annual meeting at Madras was the arrangement which had been made for the visitors by the members of the leading educational institutions in the city, including the Presidency College, Queen Mary's College, Christian College, Pachaiyappa's College and the Women's Christian College. If this practice is followed at subsequent meetings of the Board, there will be the great advantage of educationists from each University making themselves familiar with the progress achieved in other parts of India. On 1st of April of this year, the Board enters upon its fourth year of existence and we

wish it a career of increased usefulness to higher education in the country.

It cannot be said that educational questions bulked largely at the recent meeting of the Legislative Council in Madras, but there were a few points of interest to the subject in the course of the proceedings. It was a welcome announcement that was made by the Minister that every effort was being made to reduce the number of single-teacher schools. To those who have been in disappointment that action has not yet been taken on the report of Mr. Statham, regarding the expansion of elementary education, it may be some consolation to know from the assurance of the Minister that action will not be delayed. The Government also made it clear that the delay in the matter of the further development of the Andhra University was not due to the Government which was willing to spend ten lakhs of rupees on the establishment of a high class Science College at Rajahmundry, with provision for the teaching of Honours courses in many science subjects. It is a pity those concerned cannot yet agree upon a suitable centre for the University and thus delay, if not actually forego, this proffered assistance from Government. Considerable dissatisfaction was expressed with regard to text-books and Text-Book Committees and the Minister promised to look into the grievances. We hope something concrete will follow these assurances in the course of the coming year.

We invite the special attention of our readers to the report of the Vernacularisation Committee which has just been issued by the Andhra University. The Committee has arrived at the following findings, after consulting experts not merely in the Andhra University area, but also all over India:—

(1) This Committee is of opinion that the principle of vernacularisation may be adopted and introduced into the Andhra University, subject to such conditions and restrictions as may be defined hereunder.

(2) That in the opinion of this Committee, Telugu should, except in the bilingual districts of Ganjam and Bellary, be made the medium of instruction and examination in non-language subjects for students whose mother-tongue is Telugu, and others be allowed to receive instruction and undergo examination in English according to their choice, until provision is made for vernacularisation in those languages as well, agreeably to the ultimate object of the Andhra University Act.

(3) (a) That the Committee is of opinion that Government should be requested to introduce compulsory vernacularisation of studies in non-language subjects in connection with the S.S.L.C. course in the Andhra University area.

(b) In case the recommendation does not take effect, the Andhra University should hold its own Matriculation

Examination in the vernacular on the above lines.

(4) That this Committee is of opinion that vernacularisation should be introduced on the principle of grades, and not on that of subjects.

(5) That, in the opinion of this Committee, the recommendations in the foregoing resolution may be confined, to begin with, to the Secondary and Intermediate courses in continuity, starting with the 4th Form not later than July 1929.

It will be noticed that these proposals are modest and such as to deserve immediate execution. The only point on which we are inclined to differ is the question of *compulsion* as we should prefer to see the experiment succeed on its own merits. If candidates do not find it possible to prefer vernacularisation, one had better be cautious, in denying them the privilege of instruction and examination in English. We are particularly pleased with the explanatory note attached to the resolutions in the report in which all the questions relating to the subject are discussed at length and which will amply repay perusal, though we must not be understood as endorsing every opinion contained therein.

The recent decision of the Bengal Legislative Council not to provide for a paid Vice-Chancellor to the Calcutta University must be considered unfortunate. In expressing this opinion, we are moved

entirely by the merits of the question independently of any considerations regarding the present Vice-Chancellor, Prof. Jadunath Sarkar, whose administration of the affairs of the University seems to have come in recently for considerable criticism at the hands of the press in Calcutta. In any case, as he had already expressed himself against the taking of any remuneration as Vice-Chancellor, the question may be discussed without any reference to his administration, entirely in the academic interests of our Universities. The work of administering a modern University is so heavy that it requires the services of a full-timed expert. In the early days when Universities were only examining bodies in India and the Vice-Chancellor's business consisted only in his presiding over meetings of the Senate, it was possible to get on with honorary part-time Vice-Chancellors, but it is impossible to do so in the altered conditions of Universities in India to-day. It is true that Sir Asutosh Mukherjee was able to devote considerable time and attention to the affairs of the Calcutta University, though he was only an honorary Vice-Chancellor and he had very heavy work to do as a Judge of the High Court, but his case was an exception. Let us remember that he was a person of extraordinary intellectual powers endowed also with remarkable energy. It would be foolish to think that Indian Universities can get on without paid Vice-Chancellors, because once in a way, a really capable person like Sir Asutosh was found by the

Calcutta University, to carry on the duties of Vice-Chancellor without any remuneration. The most serious objection to honorary Vice-Chancellors is the circumstance that the idea practically rules out educational experts and hands over the control of academic affairs to successful lawyers and High Court Judges who alone can afford to accept such honorary jobs and who are generally deficient in the academic knowledge and experience necessary for the purpose. An educationist has not usually the means to accept such a dignified office without any remuneration. It is well-known that Prof. Jadunath Sarkar himself has done so at considerable sacrifice. He could, if he wanted, have lived a very quiet and inexpensive life in his own house at Patna, without putting himself to considerable expense at Calcutta. But it would not do to strain this love of service too much. We are firmly of opinion that the Vice-Chancellors of Universities should invariably be distinguished scholars with considerable academic experience and the only way of ensuring it is by the provision for paid, full-time officers. It will also draw out the best aspirations of the members of the educational profession who will thus have an exalted office to look forward to as the crowning end of a successful career in teaching and scholarship.

We deeply regret to record the death of Mr. G. S. Ramaswami Iyer, B.A., on the 31st instant, in his village, Ganapathi Agraharam, Tanjore

XXXIV-26

District. He was born in 1860 of a humble, and yet respectable, family and fought his way up by mere merit and indomitable industry. He had a very distinguished College career and had the privilege of being taught and trained by eminent educationists of South India, such as Messrs. Porter, Gopal Rao, R. V. Srinivasa Iyer and B. Hanumantha Rao, who played no small part in making the Kumbakonam College "the Cambridge of South India." He had won a number of prizes in the Kumbakonam College and was the recipient of the Beauchamp's College Medal. After taking his B.A. degree and with a reputation as a brilliant mathematician, he entered service in the Wesleyan Mission College, Negapatam, and served it for about fifteen years, giving his Missionary masters great satisfaction in his work. Owing to the abolition of the College classes at Negapatam, he was transferred to the Wesley College, Royapettah, Madras, as Lecturer in Mathematics, where again he served the Mission for a period of about twenty years. His whole service was spent in the Missionary institutions where he commanded the love and esteem of his students. He was one of those select educationists to whom the teaching profession was a holy and noble mission in the complete fulfilment of which they derived genuine pleasure. If he had the least desire for "making money" he would have found many profitable avenues for satisfying his ambition in that direction, but it must be said to his credit

that he realised the high social value of honest poverty. He never experienced the pangs of poverty because his contentment was rich. He found some spare hours to write books useful to students. He was the author of 'Elements of Physiology' and 'Elements of Algebra' with two others and revised Mr. S. Radhakrishna Iyer's Arithmetic, published by Messrs. Srinivasa Varadachari & Co., Mount Road, Madras. There was a lot of public spirit in him which scorned the lime-light of publicity and welcomed the opportunity to do genuine

public or social work. He was long connected with the Literary Society, Triplicane, and also Sriman Madhwa Siddhanta Onnahini Nidhi, Ltd., Triplicane, where his work earned for him wide public appreciation. It may truly be said of him that he found a calling suited to his taste and temperament and executed his mission with the true ideals of a typical Guru. He leaves behind him two daughters and a wide circle of friends and relations to bemoan his loss. We convey our sincere sympathy to the members of the bereaved family.

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One of the most important of modern developments in this science is that made through the observation of individual differences. Although education is a social process and children are social in nature, yet we cannot deal with them too much in groups without doing great injustice to matters in which they are unlike. Studies made in Europe and America have their value for Indian teachers, but observations made in India, as Miss Gordon's have been, are of great value in enabling us to ascertain the similarities and differences with children of other countries, and the differences among groups and individuals here. Miss Gordon has not only given the result of her own observations but—what is even more important—she has shown teachers and others how they may observe for themselves.

The book surveys the more important problems connected with the study of child-nature. It deals with the stage of child development, with the processes of sense-perception, with play, hand-work, and fatigue, with exceptional children, both sub-normal and supra-normal, with measurements of intelligence, and with the application of the Kindergarten system to the Indian system. It is one of the books which the Academic Council on the recommendation of the Board of Studies in Teaching has declared as suitable for candidates for the L. T. degree. We hope that it may have a wide circulation as its influence is sure to be for good.

Education (Allahabad), March 1925.

The distinguished author of the book under review is one of the few enthusiasts in India who have taken to a systematic study of child-nature. The book embodies the results of close study by the author, not merely of the existing literature on the subject, but of the actual mental and physical growths of children, as witnessed by her in several schools in Britain and India where she has had the opportunity to work. Within a brief space of 200 pages, the author has contrived, in her plain, matter of fact, and at the same time, engaging style, to elucidate the various topics connected with child life such as the sense perception, play, the service of Hand in Mental Development, fatigue, exceptional children, measurement of intelligence and the Kindergarten system; touching the various theories on these topics and supplementing them by her own views based on personal study and investigation. We would especially commend to our readers the beautiful and inspiring chapter on the Kindergarten system in which without going into technical detail, the author has surveyed the basic principles of the system and pleaded in accordance with these principles for the Indianisation of Indian education. We are sure that this little book will prove an excellent handbook for teachers as well as parents and others interested in the subject and kindle in them a deeper interest therein. It has been already recommended by the Academic Council of the Madras University as a suitable text-book for the students appearing for the L. T. Examination and we hope that other Universities will soon follow suit. We congratulate both the author and the publishers on this valuable publication and recommend every teacher to secure a copy thereof.

The Madras Christian College Magazine, January 1926.

The study of child-nature is exceedingly important for both of the sciences of Psychology and Education. Its importance for Psychology is from the genetic point of view. In the child one is able to observe in simpler forms many of the processes at work which in adult experience become so complex as to make them difficult of analysis. Its importance for Education is too obvious to need extended notice, and yet there are some who are so short-sighted as to neglect it. Here in South India there are a great number of schools in charge of teachers who do not know the elementary facts about child-nature. But with the progress of education the time will surely come when it will be considered as dangerous to employ a teacher who is ignorant of child-nature as it is to employ a man for a physician who knows nothing of anatomy and physiology. Such a book as that which Miss Gordon has written will serve a useful purpose in hastening that day by putting teachers in possession of a primer which contains the fundamentals of the subject in a readable style. It is the type of book which we would like to see translated into our South Indian vernaculars, because it not only includes the principles of the science, but states them with special reference to the needs of Indian teachers.

A personality is the outcome of forces which are both hereditary and environmental so that child study must take account of both sets of factors. Much more is to be gained by teachers through the study of children for themselves than the mere perusal of books on the subject, however authoritative they may be. The trouble with so many students of other things as well as of child-nature is the evident desire to be spoon-fed. They desire to get their information at second-hand rather than take the trouble to study for themselves. In many instances teachers have not the technique necessary to observe intelligently. Very valuable, then, is Miss Gordon's chapter on 'How to Study a Child,' particularly for those who are beginners in child study, and it is a matter of vital concern as much for the parent as for the teacher.

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