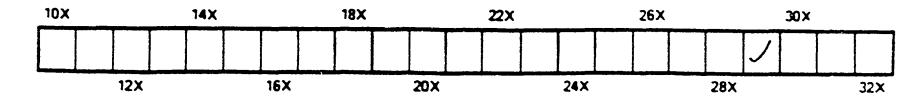
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# Educational Weekly

#### VOL. III.

#### THURSDAY, JUNE 3RD, 1886.

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# The Educational Weekly

Edited by T. ARNOLD HAULTAIN, M.A.

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TORONTO, JUNE 3, 1886.

Apropos of teachers' salaries the following remarks made by the New York School Fournal are well worth noting : "A great deal has been written about better pay that had better have been unwritten, because with it there has not been an effort made to make the quality of teaching better. Poor pay comes from poor appreciation. When any school-girl is considered able to teach school the people will not pay more more than school-girls' wages. They don't appreciate the work furnished, and they will not pay for it. All reforms must commence with the people. Here is the source of power. Out of their pockets comes the money. The most stringent prohibitory law could not be enforced in a community where the people were generally opposed to it. If the majority wanted whiskey they would have it-law or no law. On the other hand, where the people are opposed to liquor selling, whiskey has small chance under any circumstances. The people must be educated. This is the most important work of progressive teachers to-day They must show the people how immensely superior teaching is when compared with the humbug recitation. It is useless-foolish-to scold ignorant people into paying for what they don't want. In thousands of districts the people don't buy good teaching because they don't know what it is. How can they be expected to pay for what they have never heard of?"

On the following page will be found two excerpts from different writerstouching on the intimate connexion between diet and conduct. In these days when physiology is hourly encroaching upon psychology, this is no vague or visionary field for research. We are accustomed daily to read homilies on dietetics by distinguished physicians, but their immediate bearing upon health, upon habits, upon conduct, upon education, is not sufficiently brought home to us individually. The very close relationship existing between mind and body we do not properly recognize-at all events not until comparatively late in life. In youth, when the assimilating powers are strong, and when the capability of indulging in long and arduous physical exercise is enjoyed, we think little or norhing of the necessity of regulating our diet according to the nature and quantity of the work we have to perform.

This is by no means a subject to be discussed purely in the abstract, and yet it is a subject very difficult to deal with in the concrete. Upon one's pupils it is difficult to impress its importance; their parents it is almost impossible to reach. And yet something might be done, and should be attempted, in case of both pupil and parent, more especially, too, upon this continent. Medical men, we believe, agree that the character of the diet peculiar to the American people is inferior to that of England. We do not speak of the lowest classes in the British Isles. These, no doubt, suffer from the inferiority of their diet and general deprivation to a far larger extent than is ever witnessed in Canada or the United

States. But the middle classes here, we think, owing to a large number of circumstances-the lack of boarding schools; the lack of nurseries, the inferior methods of cooking; and, by no means least, the taste for all that unwholesome class of food known by the name of "cakes"-the middle classes here do not sufficiently attend to the proper feeding of their children.

That this must have some effect upon the health, habits, conduct, and, therefore, upon the ability to learn, and the whole life of the schoolroom, cannot be gainsaid. That the effect is not appreciable does not invalidate our position. Had we sufficiently accurate statistics thoroughly scientific in character it would doubtless very soon be appreciable. At all events it is not a subject to be lightly considered.

In connexion with this topic the article on "The Public Schools and Nervous Children," taken from *Education* to be found in our "Educational Opinion" columns, will be of interest. The writer points out very forcibly many of the causes of nervousness in our children, but he strangely leaves out of view that which, in our own opinion, is one of the most prevalent and virulent-innutritious and stimulating diet. Nature in all cases suits the food to the habit of life: the slow-moving, patient ox is graminivorous; the lithe and agile panther is a carnivore. So, too, man, if he is to use to their utmost perfection the very complicated powers he possesses, must take note of how to supply those powers with nourishment best suited to them.

DR. NOAH PORTER'S resignation as President of Yale College has been accepted by the Yale corporation. Prof. Timothy Dwight was unanimously selected as his successor, and will be inaugurated on July 1st, the day after commencement. His grandfather, Timothy Dwight, who was a grandson of Jonathan Edwards, was President of Yale from 1795 until 1817. President Dwight was born at Norwich, Conn., in 1828, and graduated from Yale in 1849.

# Contemporary Thought.

THE highest pressure that exists in the educational world is undoubtedly in guls' colleges and boarding schools. In some of them it is something frightful. There are very few in which the pressure is low enough for safety.—New York School Journal.

JUST think of what Riverside Libraries and Lakeside Libraries we shall have, by and by, when your Congress shall have settled the principle flat it is right to steal foreign books. And you will not be able to keep our reprints out with six times your present staff. By mail, in travellers' pockets, in their luggage, they go into your country, and nothing but the forcible annexation of Canada can stop it. Lookers on sometimes see most of the game; and, in my humble opinion, your literature made its great spring during the Civil War, when feelings of bitterness checked the reprinting of British books; when your people were out of sympathy with the English people and you turned in upon yourselves. Now you are again falling into literary bondage .- S. E. Dawson, to Harper & Bros.

"A FATHER, by prayer, and precept, and flogging, has done his best to reform his boy, whose staple diet was meat and sausage and pie and cake at his meals, with lunch between. The family physician said to the father, 'If you will put a leech back of each of your boy's cars once a week for a month, you will do more to reform him than y ur preaching and pounding will do in a year.' The father asked for the philosophy of this prescription. "Why,' said the doctor, 'your boy has bad blood and too much of it ; he must behave badly or he would burst.' 'Then,' said the father, 'I'll change his diet from beef and pie to hominy and milk.' In three months thereafter a better boy of his age could not be found in the neighborhood. The scrid, biting, evil blood had not become food for leeches, but had done its wicked work and had passed away, and a cooler order, blander power, safer blood, had been supplied from sweeter, gentler food services."-From " Food and Works." by Rev. I. T. Clymer.

AND yet, as said, some will always have to remain the servants of others. Those who mine coal or weave carpets cannot build homes. All that can be sought, then, is the most individualism possible, and the benefits of labor-saving machinery, which are for mankind, should be for the laborer as well as the capitalist. The benefits both have received in the shape of increased commodities, should be extended as far as possible to increased time and capacity for enjoying those commodities. Improved conditions of life and happiness should be for all. The dislodgment of men by machinery should drive them to the unoccupied lands. All these things are, or will be. The sequence of the present surfeit of labor must be an exodus to the prairies. The thing needful is colonization facilities from those who can enhance them to those who cannot. The proposed extension of railroads is the natural provision of the efflux that is to come. And the increased productiveness of machinery will, in the long run, keep pace with the increasing population of the world and the increasing uses of contrivances.- The Current.

THE custom is becoming so common in the towns and villages, at hotels as well as private houses, to have for breakfast optimeal, wheaten grits, or other cereals, with graham "gems" and fruit, so that the traveller may choose between such diet and the usual meat and hot cake food, that our farming communities must fall into the habit sooner or later, and give their children at least a chance to work out their own salvation. How much clearer is the head, how much less craving the appetite for drinks and stimulants, how more under subjection their temper, and how more healthful their whole system, when the food is mainly of an unexciting nature, and how soon the taste is formed to enjoy it, and to cease to crave after the fleshpots which have heretofore yielded their most noxious supplies. There are many farmers and their wives who are considering these things, but hesitate about differing from their neighbors, or are, as is too common in this country, afraid of their children; but let them once more try a change, and have their morning and evening meals consist of grains and fruit, with with well-baked bread, and not always fresh and hot, and such vegetables as they desire, and milk for the children, water and tea for coffee, and see if, after a sufficient length of time to produce effects, there is not more health, peace and contentment in the household, and a conciousness that the way is not being prepared for subsequent violences and breaches of nature's and man's laws occasioned by gross appetite and indulgences .--New England Farmer.

WHEN the lives of the prophets are written then will the biography of George Fox occupy a foremost place in the sacred list. For the great Quaker stands forth among the foremost of those who, speaking the English tongue, has also held direct converse with the Infinite Spirit, of whom it may be said, as of the heavers, there is no speech nor language where His voice is not heard. "A Divine and a Naturalist," as William Penn called him, "all of God Almighty's making," George Fox is memorable among the multitude of his contemporaries in the Seventeenth Century as one of the few whose message still echoes in the heart of man. From the background of the stirring times in which his lot was cast, four men stand out whose influence is still living and potent in these days. Oliver Cromwell, John Milton, John Bunyan, and George Fox, all of them serious, godly men, have stamped the impress of their souls upon all that is best and most enduring in the English character. Of the four the influence of George Fox is perhaps at once the most widely felt and the least recognized. There is not a Quaker living, nor has ever a Quaker lived, who has not owned more or less of his spiritual baptism to love and good works, to the Leicester cobbler, the making of whose leather breeches, Carlyle declares, was " perhaps the most remarkable incident in modern history." And no one who has even a cursory acquaintance with the farreaching sweetening and purifying influence which the Society of Friends has exerted and still exerts will be disposed to challenge the correctness of the estimate which gives the Quaker saint a position in the first rank among the four worthies of the Puritan cra. - The Pall Mall Gazette.

EVERY popular writer has a biography in these days, and this tribute to his fame was not likely to be omitted in the case of Longfellow. That the

story of his life would be told he seems to have anticipated. Writing in his journal, he says :--"How brief this chronicle is, even of my on ward life. And of my inner life not a word. If one were only sure that one's journal would never be seen by any one, and never get into print, how different the case would be I But death picks the locks of all portfolios, and throws the contents into the street for the public to scramble after." The remark is true generally, and applies with so much pertinence to the poet's own biography, that it may be regarded as prophetic. . . . No doubt it is true, as the writer says, that the quiet life of a man-of-letters can be best painted by a multitude of minute touches; but then, every touch, however slight, should add something to the fidelity of the portrait. And we disagree alto: gether with the old-fashioned apology-familiar enough in the biographies of the last century-that "the life of a man-of-letters must needs be unexciting and uneventful in the eyes of men of activities and affairs." On the contrary, the most attractive, and in some respects the most eventful, biographies in the language-the Lives of Johnson, Scott, Macaulay, and Carlyle, for examplerelate the story of men whose reputation is due to literature. "Peace has her victories," and the achievements of great authors-what they thought and what they said, how they bore the burden of life, how they suffered, failed, or conquered-create an interest not easily to be surpassed. - Spectator.

MANUAL training in public schools (says the Evening Standard, London, Eng.) is rapidly forcing itself to the front as one of the chief educational questions of the day : and Chicagoalways progressive and wideawake-has taken the matter vigorously up, and is about to re-model its schools with the intention of bringing them more into touch with the real need of the times. The new departure is to take place in September; and, after that date, technical instruction will form a chief feature of the work done in the public schools of the city. The proposal is a direct outcome of the wonderful success which has attended the kindergarten system, which is based on the well-known saying of Comenius "Things that have to be done should be learned by doing them." The intention at Chicago is to blend mental and manual training by bringing the eye and the mind into relations of closest intimacy, and by making the hand equally skilful as the organs of both. It is contended by the advocates of the system that, at present, popular education stops exactly at the point where it should begin to apply the theories it has imparted, and that the practical abolition of apprenticeship in the States means the rapid decline of America as an industrial power, unless lads at school are practically equipped for the actual work of artisans and mechanics. Professor Barbour, of Yale University, recently declared that the schools of America were suffering from congestion of the brain- there being too much theory, and far too little attempt to reduce it to practice. There is no doubt such an observation is equally applicable to schools much nearer home; and the experiment at Chicago, which is already exciting the keenest interest and criticism throughout America, will be closely watched by all sensible educationists in England, who are not above taking a hint for the improvement of the work to which they have devoted their lives.

JUNK 3, 1886.]

# Notes and Comments.

THE annual report just published by the French Ministry of Public Instruction shows the constant progress of school savings banks, the new auxiliary branch of education, down to January, 1886. Since the first establishment of a school savings bank in 1834, in the municipal school of Le Mans, many other attempts, more or less successful, have been made in France and other countries of Europe.

MR. POWDERLY is reported to have planned that the "unions" of workingmen should be used for educational purposes. The idea is a good one, but hardly practicable, as soon appeared. The ignorant supposed that it was only necessary to use compulsion and the employer would double wages. We hold firmly to the opinion that education is the ladder by which the workingman will rise to better things; it has already bettered his condition.—New York School Journal.

WE find the following admirable remarks in a recent issue of the American Teacher. They are worthy of much thought and meditation :---" To codify the utterances of any man, however good and wise, creates a scholastic dogmatism which is opposed to scientific development. It prophesies the downfall of the 'system' which, subsequently, will be useful only as food for newer and freer growths or a text for the antiquary. It seeks to keep the 'young out of the reasons,' and to condemn mankind to a deepening winter of unproductive discipleship."

IN fining the bakers who had participated in the boycott against Mrs. Gray, Justice Duffy told the men that they were not the only ones who wanted their wages raised, that all of us, himself included, want more pay. He is right. We all want an advance, but while there is a class which believes that the boycott and strike is the way to obtain this increase, there is another, and let us be thankful that it is the larger, which knows that thrift, hard-work, and steady self-improvement are the only healthy means to getting our wages raised.— The Chautauguan.

THE editor of *The Chautauquan* calls attention in an article on "Gladstone's Speecin for Ireland" in the "Outlook" for June to the American ideas in Gladstone's speech, remarking :--- "The iders (of Mr. Gladstone's speech) look very muc., tike one or two things which Thomas Jefferson put into the Declaration of Independence; for instance, 'All men are created free and equal' and 'have the inalienable rights to life, liberty, and the pursuits of happiness.' Gladstone did not quote from our great Declaration, nor did he say anything about our Republican form of government, but the spirit of 'American

Independence' and our type of political liberty made the heart and soul of his great speech. Our civilization is repeating itself in other lands, but nowhere have we witnessed such a bold and emphasic application of the American doctrine, of a government by the people, for the people, and of the people, as that Gladstone made in the House of Commons on April 8, 1886."

THE Globe (Lindon, Eng.), commenting on the proceedings of the Bradford Teachers' conference, says :-- Unquestionably the ideal school would be one in which a competent teacher was left free to educate his pupils according to his own special qualifications, to their varying powers, and to all manner of local conditions which, while no code could possibly take account of them, are the most important considerations of all. Of course a free system would make especial care in the selection of teachers needful in the first instance. But this has never been found a serious difficulty in higher class schools, where the system pursued is to choose the best man that can be found, and then-within, of course, reasonable limitsto trust him all in all. What would become of any great public school if the head master were bound to teach in somebody else's way? The result would be absurd enough to settle the matter without another word.

A CORRESPONDENT signing himself " Equity," sends us the following question :--

" During the winter of the present year a number of Roman Catholic members of three or four public schools determined to form a separate school. They complied with all the law requires in such a case, and have lately begun to teach in the new separate school. These separate school ratepayers were ratepayers of the public school sections at the time the teachers were hired for the public schools for the present year. Can the trustees of the public school levy rates on the persons who did belong to the public s hool section at the time the teacher for the latter was engaged, but who have since joined the separate school section, for the teacher's salary, or for other school expenses for the present year ?"

From the Education Department we learn that "the law provides that Roman Catholics who become supporters of separate schools are exempt from public school rates for the then current year. (See section 41, Separate Schools Act.) It does not appear, therefore, that they can be made liable for the public school teacher's salary."

The section referred to is as follows:---

"Every person paying rates, whether as proprietor or tenant, who, by himself, or his agent, on or before the first day of March in any year, gives to the clerk of the municipality notice in writing that he is a Roman Catholic, and supporter of a separate school situated in the said municipality or in a municipality contiguous thereto, shall be exempted from the payment of all rates imposed for the support of public schools, and of public school libraries, or for the purchase of land or erection of buildings for public school purposes, within the city, town, incorporated village or section in which he resides, for the then current year, and every subsequent year thereafter, while he continues a supporter of a separate school; and such notice shall not be required to be renewed annually. R. S. O. e. 206, s. 31."

As a matter of technical detail, it would appear that the answer our correspondent desires turns upon whether or not notice was given to the clerk of the municipality on or before the first day of March, in the year referred to.

WE learn from the Proceedings of the Royal Geographical Society that the exhibition at Manchester of the collection of appliances used in geographical education has been highly successful. The Manchester Society have added a number of objects to the collection, the list of which has been appended to their reprint of the R.G.S. catalogue. The Manchester Society have also issued the Report of their Education Committee, giving the results of their inquiries on the same lines as those contained in the Report of the R.G.S. The following are the conclusions to which the Manchester Society have come as the result of their inquiry. "1. That in the primary schools, apparatus of a simple but scientific kind is required. 2. That a better class of maps, relief maps, models, and globes are required. 3. That a perfect text-book should be produced. 4. That it is useless to expect more time can be given to this as a special subject; but that, in connection with history (from which it cannot be divorced), it may, in its historical relations, be fairly dealt with. 5. That in secondary and middle-class schools and colleges more encouragement should be given to the study. 6. That if the subject was specialised at the universities by lectureships and other means, a body of competent men would in time be produced. capable of dealing with it, whose knowledge and interest in the subject would in time act upon the lower schools. 7. That we want some system of progressive education in this matter which, whatever the text-book, shall be progressive in its operation. 8. That if an examination in this subject and certificates for teachers could be obtained, a great advance in the interest of the subject would be secured. 9 That if a system of prizes could be formed (or the Royal Geographical Society's prizes obtained) by the Geographical Society, and if the university could be arranged with to form a body for examination in conjunction with the Society, and if, lastly, we press the attention of those concerned to the necessity of the science being taken as a whole, mathematical, physical, topographical, historical, and political, we shall have done something to place it in its proper and legitimate position."

## Literature and Science.

#### "I WILL BE SORRY FOR THEIR CHILDISHNESS,"

My little son, who looked from thoughtful eyes, Had moved and spoke in quiet, grown-up wise, Having my law the seventh time disobey'd, I struck him, and dismissed With hard words, and unkissed ; His mother, who was patient, being dead, Then, fearing lest his grief should hinder sleep, I visited his bed. But found him slumbering deep, With darkened eyelids, and their lashes yet From his late solbing wet. And I, with moan, Kissing away his tears, left others of my own ; For, on a table drawn beside his head, He had put within his reach a box of counters and a red-veined stone, A piece of glass abraded by the beach, And six or seven shells. A bottle with bluebells, And two French copper coins ranged there with careful art. To comfort his sad heart. So, when that night I pray'd To God, I wept, and said : Ah, when at last we lie with tranced breath, Not vexing Thee in death, And Thou rememberest of what toys We made our joys. How weakly understood Thy great commanded good. Then, fatherly, not less Than I whom Thou hast moulded from the clay, Thou'lt leave Thy wrath and say, "I will be sorry for their childishness."

-Coventry Patmore.

#### ADVENTURES OF ULYSSES.

#### BY CHARLES LAND.

CHAPTER I.

THIS history tells of the wanderings of Ulysses and his followers in their return from Troy, after the destruction of that famous city of Asia by the Grecians. He was inflamed with a desire of seeing again, after a ten years' absence, his wife and his native country, Ithaca. He was king of a barren spot, and a poor country in comparison with the fruitful plains of Asia, which he was leaving, or with the wealthy kingdoms which he touched upon in his return; yet, wherever he came, he could never see a soil which appeared in his eyes half so sweet or desirable as his country earth. This made him refuse the offers of the goddess Calypso to stay with her, and partake of her immortality in the delightful island; and this gave him strength to break from the enchantments of Circe, the daughter of the Sun.

From Troy, ill winds cast Ulysues and his fleet upon the coast of the Cicons, a people hostile to the Grecians. Landing his forces, he laid siege to the chief city, Ismarus, which he took, and with it much spoil; and slew many people. But success proved fatal to him ; for his soldiers, clated with the spoil, and the good store of provisions which they found in that place, fell to eating and drinking, forgetful of their safety, till the Cicons, who inhabited the coast, had time to assemble their friends and allies from the interior ; who, mustering in prodigious force, set upon the Grecians, while they negligently revelled and feasted, and slew many of them, and recovered the spoil. They, dispirited and thinned in their numbers, with difficulty made their retreat good to the ships.

Thence they set sail, sad at heart, yet something cheered that with such fearful odds against them they had not all been utterly destroyed. A dreadful tempest ensued, which for two nights and two days tossed them about, but the third day the weather cleared, and they had hopes of a favourable gale to carry them to Ithaca; but, as they doubled the Cape of Malea, suddenly a north wind arising drove them back as far as Cythera. After that, for the space of nine days, contrary winds continued to drive them in an opposite direction to the point to which they were bound, and the tenth day they put in at a shore where a race of men dwell that are sustained by the fruit of the lotus-tree. Here Ulysses sent some of his men to land for fresh water, who were met by certain of the inhabitants, that gave them some of their country food to eat -not with any ill intention towards them, though in the event it proved pernicious; for, having eaten of this fruit, so pleasant it proved to their appetite that they in a minute quite forgot all thoughts of home, or of their countrymen, or of ever returning to the ships to give an account of what sort of inhabitants dwelt there, but they would needs stay and live there among them, and eat of that precious food forever ; and when Ulysses sent other of his men to look for them, and to bring them back by force, they strove and wept, and would not leave their food for heaven itself, so much the pleasure of that enchanting food had bewitched them. But Ulysses caused them to be bound hand and foot, and cast under the hatches; and set sail with all possible speed from that baneful coast, lest others after them might taste the lotus, which had such strange qualities to make men forget their native country and the thoughts of home.

Coasting on all that night by unknown and out-of-the-way shores, they came by daybreak to the land where the Cyclops dwell, a sort of giant shepherds that neither sow nor plough, but the earth untilled produces for them rich wheat and barley and grapes, yet they have neither bread nor wine, nor know the arts of cultivation, nor care to know them ; for they live each man to himself, without laws or government, or anything like a state or kingdom ; but their dwellings are in caves, on the steep heads of mountains; every man's household governed by his own caprice, or not governed at all; their wives and children as lawless as themselves, none caring for others, but each doing as he or she thinks good. Ships or boats they have none, nor artificers to make them, no trade or commerce, or wish to visit other shores, yet they have convenient places for harbours and for shipping. Here Ulysses with a chosen party of twelve followers landed, to explore what sort of men dwelt there, whether hospitable and friendly to strangers, or altogether wild and savage, for as yet no dwellers appeared in sight.

The first sign of habitation which they came to was a giant's cave rudely fashioned, but of a size which betokened the vast proportions of its owner; the pillars which supported it being the bodies of huge oaks or pines, in the natural state of the tree. and all about showed more marks of strength than skill in whoever built it. Ulysses. entering it, admired the savage contrivances and artless structure of the place, and longed to see the tenant of so outlandish a mansion; but well conjecturing that gifts would have more avail in extracting courtesy than strength would succeed in forcing it, from such a one as he expected to find the inhabitant, he resolved to flatter his hospitality with a present of Greek wine, of which he had store in twelve great vessels, so strong that no one ever drank it without an infusion of twenty parts of water to one of wine, yet the fragrance of it even then so delicious that it would have vexed a man who smelled it to abstain from tasting it; but whoever tasted it, it was able to raise his courage to the height of heroic deeds. Taking with them a goat-skin flagon full of this precious liquor, they ventured into the recesses of the cave. .Here they pleased themselves a whole day with beholding the giant's kitchen, where flesh of sheep and goats lay strewed; his dairy, where goat-milk stood ranged in troughs and pails; his pens, where he kept his live animals; but those, he had driven forth to pasture with him when he went out in the morning. While they were feasting their eyes with a sight of these curiosities, their ears were suddenly deafened with a noise like the falling of a house. It was the owner of the cave, who had been abroad all day feeding his flock, as his custom was, in the mountains, and now drove them home in the evening from pasture. He threw down a pile of fire-wood, which he had been gathering against supper-time, before the mouth of the cave, which occasioned the crash they heard.

(To be continued.)

# Special Papers.

EXERCISES IN ENGLISH FOR FOURTH FORM CLASSES.

1. RE-WRITE in your own words, bringing out the meaning fully :---

- (a) "Here underneath this little stone Lies Robert, Earl of Huntingdon, Known by the name of Robin Hood, Who was a thief and archer good. Full thirty years and something more, He robbed the rich to feed the poor. Such outlaws as he and his men Will England never see again."
- (b) "How dear to my heart are the scenes of my childhood, When fond recollection presents them to view t
  - The orchard, the meadow, the deep-tangled wildwood,
  - And every loved spot which my infancy knew."
- (c) " Honour and shame from no condition rise ; Act well your part, there all the honour lies."
- (a) "The mountains look on Marathon And Marathon looks on the sea;
   And musing there an hour alone, I dreamed that Greece might still be free."
- (c) "Be still, sad heart 1 and cease repining; Behind the clouds is the sun still shining; Thy fate is the common fate of all, Into each life some rain must fall, Some days must be dark and dreary."

2. Change the voice of the verbs in the following sentences :--

(a) The bank was entered by the burglars.

(b) I explained the matter to him.

- (c) His Honour had counselled him on a previous occasion.
- (d) The industrious bees had stored their luscious hoard.
- (c) I saw the other day in the village cometery of Somerville, N. J., her resting-place. (f) Avoid a scoffer.

3. Tell the subject of the verbs in the following sentences :

(a) Learn to do good.

(b) The little Christian band the Pagans drowned.(c) The great pioneer in this work was the

- illustrious Raleigh.
  - (d) Wide through the landscape of his dreams The lordly Niger flowed.
  - (e) He was stunned by that loud and dreadful sound, Which sky and ocean smote.

4. Expand these simple sentences into compound or complex ones :--

(a) The common way of determining is to refer to the dictionary.

(b) I supposed him to be my friend.

(c) The low of herds

Blends with the rustling of the heavy grain Over the dark-brown furrows.

(d) Tennyson, author of the "May Queen," wrote the poem of introduction.

(e) Explain the manner of finding the unknown quantity.

(f) Walking across the meadow, I met the animal.

(y) On this cloth was a massive silver waiter with a decanter on it.

(h) Sir Roger being landlord to the whole the congregation, is able to keep them in very good order.

5. Construct sentences to show that these words may be used having different values : below, sunset, gold, but, off, fit, rest, look, French, pretty, on, essay.

6. Supply the ellipses in the following sentences:-

(a) John likes Lizzie as well as Hattie.

(b) He acted as if he wanted it.

(c) He is not so tall as you.

(d) It is colder now than at five o'clock.

(e) What can be easier than to supply such an ellipsis.

(/) "How old are you, Thomas ?" "Thirtcen."

(g) "Had she a mission in the world?" "Certainly."

7. Change from complex to compound sentences :--

(a) The uncle, who was up-stairs, soon appeared on the scene.

(b) Though he has gone away I believe in his speedy return.

(c) You will be too late, boys, if you do not hurry.

(d) I know that he did it.

(c) As he had the knife in his hand he deserves to be published.

8. Pluralize these words : -Ally, alley, Lieutenant-governor, Francis, happiness, folio, oasis, summons, lady, money, staff, stuff.

9. Tell the kind of phrase in these sentences :--

(a) Early to bed, and early to rise, Makes a man healthy, wealthy and wise.

(b) It was in this place I met him.

(c) It was to Georgetown he retired to spend the remaining years of his life.

(d) I come from haunts of coots and hern.

(e) Crossing the fields, I met the waggon near the pile of stones.

(f) I have work to do.

(g) The road by the school is the nearest.
10. (a) Divide into syllables :- Syllabica-

tion, introduce, emaciate, continued, wherever, glory, touched, offences, melanciroly.

(b) Write other words, of different spelling, but the same sound :--told, by, place, red, air, are, ore, links, strait.

11. Parse the italicized words in the following sentences :---

(a) The neighbours, *hearing what* was going *forward*, came *flocking* about us.

(b) No longer relieving the miserable, he sought only to enrich himself by their misery.

(c) The younger, who was yet a boy, had nothing striking in his appearance.

(d) There was a good fire in the next parlour, which the company were about to leave, being then paying their reckoning. 12. Correct :---

(1) James, bring me a pint of east.

(2) The master's bell hasn't rung I don't think.

(3) What kind of a factory is it?

(4) Who will I give this column to ?(5) The desks are not hacked like in some

schools, but some need tightening.

(6) The school ground slants in the west, and in the spring when the snow melts it flows across it under the school and past by the flower bed in a ditch which was dug by the boys.

(7) John Thompson was fined \$5 and costs for secreting a case of smallpox in the court yesterday.

(8) I can show the book from whence he took it. ALFA.

#### THE RELATIONS OF HISTORY AND GEOGRAPHY.

THE exhibition of the appliances now in use in the schools of several European countries for giving instruction in the varicus branches of geography was much appreciated by a multitude of visitors to the Marlborough street Galleries during several weeks of the last winter. Members of the Legislature and intelligent merchants, as well as distinguished travellers, professors, and men of science, rendered their assistance in various ways. From the time of its opening by the Marquis of Lorne to its close at the end of January, the exhibition may be considered to have succeeded in its object, as it offered to a very large number of teachers an opportunity for investigating different methods of geographical instruction, and as it secured the interest of others in the value of the knowledge of geography to a commercial and colonizing country. The Council of the Royal Geographical Society can have no reason to regret that, as one outcome of the report of its commissioner, it undertook to place before the public the matericl which Mr. Keltie had collected from the educational institutions of the Continent. Among the incidents of the exhibition were four afterneon meetings. Mr. Ravenstein read a paper on "The sims and Methods of Geographical Education," and and Mr. Keltie on the appliances exhibited. Mr. James Bryce, M.P., gave a lecture on "The Relations of History and Geography," and Professor Mosely, of Cambridge, concluded the series by a discourse on "Geography in its Scientific Aspect." These meetings, and the discussions with which they closed, were so valuable in eliciting the opinions of experts, that many regretted that other opportunities were not afforded for the further consideration of the many points of interest which naturally presented chemselves. Mr. Bryce's lecture has been published in the Contemporary Review, and we have perused with intense interest this

thoughtful and philosophic discourse, which must afford both pleasure and profit to all to whom it is accessible.

It is in discovering the varying effects produced on the growth of man as a social and political, a wealth-acquiring and state-forming creature, by the geographical surroundings in which he is placed, that we find the meeting point of geography and history. In this interesting investigation of the environment of historical man a threefold set of influences seems to determine his development. The contour of the land in early times fixed the spots in which civilization might develop, and dominate the routes of commerce. Lofty plateaux were not usually as inviting as the plains; and, except for security, fertile valleys were preferred to the mountain slopes. The indented coast seemed to stimulate maritime enterprise. whilst harbourless shores offered little encouragement to commerce. Heat and moisture are recognised as prime factors in the productiveness of the soil, and the influence of climate tells also most powerfully on the strength, stature, and habits of the race. Extreme droughts make nomad trik 's; a rich and well-watered soil will secure a settled population. The products presented to human industry-mineral, vegetable, or animal-constitute a third class of influences of environment, not only on account of the nature and extent of the commerce thereby determined, but also because of the limits which the absence of certain products place upon the development of civilization. The want of fuel, for example, whether in sterile Iceland, or in Central Asia, makes a high type of civilization almost impossible. Many and diverse are the branches of geography to which a student may devote his attention. The characteristics of the various races of man and their distribution; the health-condition of the land surface; the interchange of products; the diffusion and differences of language; the boundaries of States; national immigrations; and the free transit of goods may be named as constituting ethnological, sanitary, commercial, linguistic, and political geography, the last named including the military and legal aspect of this wide subject. The great Alexander founded the Egyptian city which bears his name with a view to the development of the trade with India; and in the middle ages Venice, Genoa, and Pisa flourished on this commerce with the East. The discovery of the route round the Cape of Good Hope robbed these Mediterranean cities of their pre-eminence. England began to rise in importance as a maritime power, and the history of Europe and the East to assume a new complexion. The recent restoration of the old trade route by the Sucz Canal has tended to limit the commerce of England. Tes, for instance, is not so extensively exported as formerly

from our bonded warehouses, because the countries of Europe, and especially Russia, via Odessa, can now more easily obtain supplies direct from China. So also with regard to other Eastern products which used to be extensively imported for redistribution from our chief ports to the commercial centres on the Continent. Should the Panama Canal scheme be successfully accomplished, the trade of the western coasts of both North and South America would receive a new impetus, and a great part of the commerce of Australasia would also be diverted into this new channel. The formation of an interoceanic canal may thus even vitally affect the social and political condition of a large portion of the human race.

In Asiatic geography the dominant fact is the existence of a high central plateau with a vast area of dry lands unfit for the development of wealth. Hence the dense population of that continent is found in the warm valleys on the east and south, as the northern plain is deprived of the kindly influences of tropical winds by the intervening lofty tablelands. The snowy barrier of the Himalayas, and the sandy desert of Turkestan, have almost entirely prevented intercourse between north and south, and greatly diminished the relations between the east and the west. Empires have been founded by invaders from Central Asia, but having no nucleus of a settled population, they have not been enduring. China was conquered by a race from the west, and, as no physical barrier exists, the present dynasty still holds sway over its ancient home at the foot of the Thian Shan. Greece, cut up into small plains and valleys, peninsulas and islands, was the home of almost as many different States-all influenced, however, by the presence of Parnassus, whose lofty peaks, visible from nearly every district, continually suggested the existence of the Delphic Oracle, which for many purposes is the central point of Greek history. The plateau of Albania supplies a geographical reason for the isolation of its inhabitants, who are unlike other Europeans, and the limestone table-land of Montenegro, so difficult of access, explains the independence of its scanty population. The Illyrian Archipelago, like the coasts of Norway and Denmark, could not fail to raise a race of bold sailors, and their piratical exploits rendered their swift galleys the terror of the Adriatic Sea. The approach of the Apennines to the eastern coast of Italy determined the development of civilization on the opposite slope in the valleys of the Tiber and the Arno: whilst the Teuton descent upon the fruitfal plains of Lombardy contributed, by the vigour of the race, to develop that wonderful creative power in art and literature which astonishes the student of the eventful annals of mediæval Italy. The Pyrenees form a

barrier which Napoleon himself could not efface, and the political connexion between France and Spain has never long subsisted. Had a range of mountains crossed France from east to west, that country would most probably have contained two distinct States. The physical features of the British Isles, though on so small a scale, have not been without their influence. The settlement of so large a proportion of the population on the coal-fields, and the development of new industries, have given to the northern counties an importance which, before the discovery of this mineral wealth, was confined to the south of England. The superior intelligence of the manufacturing districts is an important element of political power. Marked differences between the inhabitants of even adjacent areas are still patent to observation, although the rail and steam tend to their destruction. Man's skill has given him increasing power over Nature. By clothes and houses he conquers climate, by steam he is independent of the winds, and by artificial light he has secured extended industry to the workmen of northern latitudes. Cheap conveyance enables man to carry labour where it is needed; and the migration of the coolies of India, of the Chinese, and of the Germans and Irish, has been possible only as the result of scientific discovery. The new marine engine, by its economy of fuel, allows increase of stowage, and thus corn from the fertile plains of Minnesota, of India, or of Australia, can compete in the market with the cereals of Europe. The world is, in fact, becoming practically smaller with every advance of civilization; but, as international relations become more intimate and delicate, the political problems involved can bardly fail to be of a character more difficult and more complex .- The Schoolmaster (London, Eng.).

MR. RICHARD PROCTOR in his journal Knowledge is publishing an alphabetical series of "Americanisms." Mr. Proctor has travelled widely in America and used his note-book freely.

How shall, or rather how must number be trught? I use this word must because, primarily and fundamentally, there is only one way to teach number—that is, by direct observation of numbers of objects. We may, it is true, teach the language of number leaving the association of the language with the ideas they should recall, to accident, and fondly imagine that we are teaching number. As well might we try to teach the facts in botany without plants, in zoology without animals, form without forms, and colours without colours, as to teach number without numbers of objects.—F. W. P., in the New York School Journal.

#### JUNE 3, 1886.]

#### THE EDUCATIONAL WEEKLY.

## Mathematics.

| 15. (1) Solve $(x+y)(x-y)=a$ (1)<br>$\frac{x+y}{x+y} = \frac{145}{x^2+y^2}$ (2)<br>From (2) $x+y=\frac{145(x-y)}{x^2+y^2}$ (2)<br>From (1) $x+y=\frac{a}{a^2}$<br>$\therefore \frac{a^2+y^2}{x-y} = \frac{145(x-y)}{4a^2+y^2}$<br>$\therefore \frac{x^2+y^2}{x-y} = \frac{145(x-y)}{4a}$<br>$\therefore \frac{x^2+y^2}{x-y} = \frac{29}{8}(x-y)$<br>$\therefore \frac{x^2+y^2}{x-y} = \frac{29}{8}(x-y)$<br>$\therefore 8x^3+8y^3 = 29(x-y)^3$<br>$\therefore 8x^3+8y^3 = 29(x-y)^3$<br>$\therefore 8x^3+8y^3 = 29(x-y)^3$<br>$\therefore 8x^3+8y^2 = 325x^3 - 58xy + 29y^3$<br>$\therefore 8x^3+8y^2 = 325x^3 - 58xy + 29y^3 = 0$<br>$\therefore (x-3y)(3x-7y) = 0$<br>$\therefore y = \frac{3}{7}x$ or $\frac{7}{3}x$<br>Eut from (1) $x^2 - y^2 = 40$<br>$\therefore x^3 - \frac{9}{9}x^3 = 40$<br>$\frac{49}{49}x^2 = 40$<br>$\therefore x^3 - \frac{9}{9}x^3 = 40$ .<br>$\frac{49}{7}x^2 + 29$<br>$\frac{x^3 + y^3}{x+y^2} = \frac{a^2+b^3}{a+b}; \frac{x^4+y^4}{x^2+y^2} = \frac{a^4+b^4}{a^2+b^3}$<br>Let $y = xz$<br>Then<br>$\frac{x^3 + y^3}{x+y^2} = \frac{a^2+b^3}{a+b}; \frac{x^4+x^4y^4}{x^2} = \frac{a^4+b^4}{a^2+b^3}$<br>$\therefore \frac{1+y^3}{1+y^2} = \frac{a^2+b^3}{a+b}; \frac{x(1+y^3)}{x^2} = \frac{a^4+b^4}{a^2+b^3}$<br>$\therefore \frac{1+y^4}{1+y^2} = \frac{a^4+b^4}{a+b^4}; \frac{x(1+y^4)}{x^2+y^2} = \frac{a^4+b^4}{a^2+b^3}$<br>$\therefore \frac{1+y^4}{1+y^2} = \frac{a^4+b^4}{a+b^4}; \frac{x(1+y^4)}{x^2+y^2} = \frac{a^4+b^4}{a^2+b^4}$<br>$\therefore \frac{1+y^4}{1+y^2} = \frac{a^4+b^4}{a+b^4}; \frac{x(1+y^4)}{a^2+b^4} = \frac{a^4+b^4}{a^2+b^4}$<br>$\therefore \frac{1+y^4}{1+y^2} = \frac{a^4+b^4}{a^2+b^2} = \frac{a^4+b^4}{a^2+b^4}$<br>$\therefore \frac{1+y^4}{1+y^2} = \frac{a^4+b^4}{a^2+b^2} = \frac{a^4+b^4}{a^2+b^3}$<br>$\therefore \frac{1}{a^4-a^4} = \frac{a^4+b^4}{a^4+b^4} = \frac{a^4+b^4}{a^4(a-b^4)y^2+2(a^4+b^4)y^2-(a^4+b^4)y^2-a^4y^2+b^4y^4}$<br>$\therefore a(a(a-b)^2y^4-(a^4+b^4)y^2+2(a^4+b^4)y^2-($  | SOLUTIONS T                                    | CO FIRST CLASS "A"AND "B" ALGEBRA PAPERS FOR   | 1883. |
|---|--|--|-------|
| From (1) $x + y = \frac{i + 5}{x^2 + y^2}$<br>From (1) $x + y = \frac{i + 5}{x^2 + y^2}$<br>$\therefore \frac{40}{x - y} = \frac{i + 5(x - y)}{x^2 + y^2}$<br>$\therefore \frac{x^3 + y^2}{x - y} = \frac{i + 5(x - y)}{x^2 + y^2}$<br>$\therefore \frac{x^3 + y^2}{x - y} = \frac{i + 5(x - y)}{40}$<br>$\therefore \frac{x^3 + y^2}{x - y} = \frac{29}{8} (x - y)$<br>$\therefore \frac{x^3 + 5y^3}{x - y} = \frac{29}{8} (x - y)$<br>$\therefore 8x^3 + 5y^3 = 29x^3 - 55xy + 29y^3$<br>$\therefore 1(x - 3y)(x - 7y) = 0$<br>$\therefore (y - 3y)(x - 7y) = 0$<br>$\therefore y = \frac{3}{7}x$ or $\frac{7}{3}x$<br>But from (1) $x^2 - y^2 = 40$<br>$\therefore x^3 - \frac{3}{29}x^4 = 40$<br>$\frac{40}{x^3}x^4 = 40$<br>$\therefore x^2 - \frac{49}{9}x^4 = 40$<br>$\therefore x^2 - \frac{49}{9}x^4 = 40$<br>$\therefore x^2 - \frac{49}{9}x^4 = 40$ $\therefore -\frac{40}{9}x^4 = 40$ and $x = \pm \sqrt{-9}$ and $y = \pm \frac{7}{3}\sqrt{-9}$<br>15. (2) Solve<br>$\frac{x^3}{x + y^3} = \frac{a^3 + b^3}{a + b^5}; \frac{x^4 + y^4}{x^2 + y^2} = \frac{a^4 + b^4}{a^2 + b^4}$<br>Let $y = vx$<br>Then<br>$\frac{x^4 + v^{3x}}{x + v^2} = \frac{a^2 + b^3}{a + b^5}; \frac{x(1 + v^4)}{1 + v^2} = \frac{a^4 + b^4}{a^2 + b^4}$<br>$\therefore \frac{(1 + v^3)}{1 + v^3} \times \frac{1 + v^9}{1 + v^2} = \frac{a^4 + b^4}{a^2 + b^4} \times \frac{a + b}{a^2 + b^4}$<br>$\therefore \frac{1 + v^4}{1 + v^4} \times \frac{1 + v^9}{1 + v^2} = \frac{a^4 + b^4}{a^2 + b^4} \times \frac{a + b}{a^2 + b^4}$<br>$\therefore \frac{1 + v^4}{1 + v^2} \times \frac{1 + v^9}{1 + v^2} = \frac{a^4 + b^4}{a^2 + b^4} \times \frac{a + b}{a^2 + b^4}$<br>$\therefore \frac{a^4 - a^4 x + 2a^4 v^2 - a^4 v + 4a^4 v + a^4 v + a^4 v + 2a^2 v^2 v - a^4 v^2 + b^4 v^4}$<br>$\therefore a^4 (a - b)^3 v^4 - (a^4 + b^4) v^2 + 2(a^4 + b^4) v^2 - (a^4 + c^4) v^2 + a^4 (a^4 + b^4) v^4 + a^4 (a^4 - b^3) v^4 $   | 15. (1) Solve (x-                              | +y(x-y) = 40 (1)   |       |
| From (1) $x + y = \frac{40}{x - y}$<br>$\therefore \frac{40}{x - y} = \frac{145(x - y)}{x^2 + y^3} = \frac{145(x - y)}{40}$ $\therefore \frac{x^3 + y^3}{x - y} = \frac{23}{8}(x - y)$ $\therefore \frac{x^3 + y^3}{x - y} = \frac{23}{8}(x - y)$ $\therefore \frac{x^3 + y^3}{x - y} = \frac{23}{8}(x - y)$ $\therefore \frac{x^3 + y^3}{x - y} = \frac{23}{8}(x - y)$ $\therefore \frac{x^3 + 8y^3}{x - y} = \frac{23}{8}(x - y)$ $\therefore (x - 3y) = 0$ $\therefore y = \frac{3}{7}x \text{ or } \frac{7}{3}x$ But from (1) $x^2 - y^3 = 40$ $\therefore x^3 - \frac{9}{49}x^3 = 40$ $\therefore x^3 - \frac{9}{49}x^3 = 40$ $\therefore x^3 - \frac{9}{49}x^3 = 40$ $\therefore x^3 = 49 \therefore x = \pm 7$ And $y = \frac{3}{7} \text{ of } \pm 7 = \pm 3$ Also $x^5 - \frac{49}{9}x^4 = 40$ $\therefore x^3 = \frac{4+\delta^3}{x + y^5} = \frac{a^4 + \delta}{a^2 + b^3}; \frac{x^4 + y^4}{x^2 + y^3} = \frac{a^4 + b^4}{a^2 + b^5}$ Let $y = vx$ Then $\frac{x^3 + v^3x^3}{x + vx} = \frac{a^2 + b^3}{a + b^3}; \frac{x(1 + v^4)}{1 + v^3} = \frac{a^4 + b^4}{a^2 + b^5}$ $\therefore \frac{1 + v^5}{1 + v^5} \times \frac{1 + v}{1 + v^5} = \frac{a^4 + b^4}{a^2 + b^4} \times \frac{a^4 + b^4}{a^2 + b^5}$ $\therefore \frac{1 + v^4}{(1 - v + x^3)(1 + v^3)} = \frac{a^4 + b^4}{(a^2 - ab^2 + b^2)(a^2 + b^2)}$ $\therefore a^4 - a^4 + a^4 x^3 - a^4 x^3 + a^4 x^4 - a^4 x^3 - a^4 x^3 + b^4 x^4 + a^4 x^4 - a^4 x^3 + a^4 x^4 + a^4 x^4 - a^4 x^4 + a^4 x^4 + a^4 x^4 - a^4 x^4 + a^4 x^4 + a^4 x^4 - a^4 x^4 + a^4 x^4 $  | $\frac{x+y}{x-y} =$                            | $=\frac{145}{x^{9}+y^{9}}$ (2)   |       |
| $ \begin{array}{l} \therefore \frac{40}{x-y} = \frac{145(x-y)}{x^2+y^3} \\ \vdots \frac{x^2+y^3}{x-y} = \frac{145(x-y)}{40} \\ \vdots \frac{x^3+y^3}{x-y} = \frac{29}{8} (x-y) \\ \vdots \frac{x^3+y^3}{x-y^3} = \frac{29}{8} (x-y) \\ \vdots \frac{x^3+y^3}{x+y^3} = \frac{29x^3}{58y^3} + \frac{29y^3}{9} = 0 \\ \vdots \frac{x^3}{y} = \frac{3}{7} x \text{ or } \frac{7}{3} x \\ \text{But from } (1) z^3 - y^3 = 40 \\ \vdots \frac{x^3}{y} = \frac{3}{7} x \text{ or } \frac{7}{3} x \\ \text{But from } (1) z^3 - y^3 = 40 \\ \vdots \frac{x^3}{y} = \frac{3}{49} x^4 = 40 \\ \vdots \frac{x^3}{y} = \frac{3}{7} \text{ or } \frac{7}{3} x \\ \text{And } y = \frac{3}{7} \text{ of } \frac{1}{7} z \pm \frac{3}{2} \\ \text{And } y = \frac{3}{7} \text{ of } \frac{1}{7} z \pm \frac{3}{2} \\ \text{Als } z^3 - \frac{49}{9} x^4 = 40 \\ \vdots \frac{x^3}{x+y^3} = \frac{a^3+b^3}{a+b} ; \frac{x^4+y^4}{x^2+y^3} = \frac{a^4+b^4}{a^2+b^3} \\ \text{Let } y = \frac{x}{x} \\ \text{Then } \\ \frac{x^2+y^3x}{x+yx} = \frac{a^2+b^3}{a+b} ; \frac{x^4+x^4y^5}{x^2+y^2} = \frac{a^4+b^4}{a^2+b^4} \\ \vdots \frac{x^4+y^3x^3}{(1+y^3)} = \frac{a^3+b^3}{a+b} ; \frac{x^4+x^4y^5}{(1+y^3)} = \frac{a^4+b^4}{a^2+b^3} \\ \vdots \frac{1+y^5}{(1+y^3)} = \frac{a^4+b^5}{a+b} ; \frac{x^4+x^4y^5}{(1+y^3)} = \frac{a^4+b^4}{a^2+b^5} \\ \vdots \frac{1+y^4}{(1-y+y^3)(1+y^3)} = \frac{a^4+b^4}{(a^2-ab^4)a^2(a+b^3)(a^2+b^5)} \\ \vdots \frac{1+y^4}{(1-y+y^3)(1+y^3)} = \frac{a^4+b^4}{a^4+b^4} = \frac{a^4+b^4}{a^4+b^3} \\ \vdots \frac{x^4-a^3+2a^4b^3-a^{3}b^3+b^4+a^4y^5-a^4by+2a^4b^2y^5-a^4y^3+b^4y^4}{a^4(a-b)^2=0} \\ \vdots \frac{x^6-a^4+b^4}{a^4(a-b)^2}y + \frac{2}{a^4}(\frac{a^4+b^4}{a^4}) = \frac{a^4+b^4}{a^4(a-b)^2} \\ \vdots \frac{y^5-a^4-a^4+b^4}{a^4(a-b)^2}y + \frac{2}{a^4}(\frac{a^4+b^4}{a^4}) = \frac{a^4+b^4}{a^4(a-b)^2} \\ \vdots \frac{y^5-a^4-a^4+b^4}$ | From (2) x+y=                                  | $\frac{145(x-y)}{x^2+y^2}$   |       |
| $\begin{array}{l} \therefore \frac{x^3 + y^2}{x - y} &= \frac{145(x - y)}{40} \\ \vdots \frac{x^3 + y^3}{x - y} &= \frac{29}{6} (x - y) \\ \vdots \frac{x^3 + 8y^3}{x - y} &= \frac{29}{6} (x - y)^3 \\ \vdots 8x^4 + 8y^3 &= 29(x - y)^3 \\ \vdots 8x^4 + 8y^3 &= 29x^2 - 58xy + 29y^4 \\ \vdots 2tx^3 - 58xy + 2ty^3 &= 0 \\ \vdots (7x - 3y(3x - 7y)) = 0 \\ \vdots y &= \frac{3}{7} x \text{ or } \frac{7}{3} x \\ \text{But from (1) } x^2 - y^3 &= 40 \\ \vdots x^3 - \frac{9}{9}x^4 &= 40 \\ \vdots x^3 - \frac{9}{9}x^4 &= 40 \\ \vdots x^3 - \frac{9}{9}x^4 &= 40 \\ \vdots x^3 - \frac{49}{9}x^4 &= 40 \\ \vdots x^3 - \frac{49}{2}x^4 &= \frac{x}{7} \\ \text{And } y &= \frac{3}{7} \text{ of } \pm 7 \\ = \pm 3 \\ \text{Also } x^4 - \frac{49}{4}x^4 &= \frac{x^4 + b^5}{x^2 + \frac{x^2 + y^4}{x^2 + y^4}} &= \frac{a^4 + b^4}{a^2 + b^4} \\ \text{Let } y &= xx \\ \text{Then } \\ \frac{x^4 + x^4x^2}{x + xx^2} &= \frac{a^3 + b^5}{a^2 + b^5} \\ \vdots \frac{x^4 + x^4y^4}{1 + y^3} &= \frac{a^4 + b^5}{a^2 + b^5} \\ \vdots \frac{x^4 + x^4y}{1 + x^3} &\times \frac{1 + x^4}{1 + x^5} &= \frac{a^4 + b^4}{a^2 + b^5} \\ \vdots \frac{1 + x^4}{(1 - v + v^3)(1 + v^2)} &= \frac{a^4 + b^4}{(a^2 - a + b^4)x^4 + a^4 b + b^4 + b^$   | From (1) $x+y=$                                | $\frac{40}{x-y}$   |       |
| $\frac{x^3 + y^3}{x - y} = \frac{29}{8} (x - y)$ $\therefore 8x^3 + 8y^3 = 29(x - y)^3$ $\therefore 8x^3 + 8y^3 = 29x^3 - 58y + 29y^3$ $\therefore 21x^3 - 58xy + 21y^3 = 0$ $\therefore (7x - 3y)(3x - 7y) = 0$ $\therefore y = \frac{3}{7}x \text{ or } \frac{7}{3}x$ But from (1) $x^3 - y^3 = 40$ $\therefore x^3 - \frac{9}{49}x^3 = 40$ $\frac{40}{7}x^2 = 40$ $\therefore x^3 = 49 \therefore x = \pm 7$ And $y = \frac{3}{7}$ of $\pm 7 = \pm 3$ Also $x^5 - \frac{49}{49}x^3 = 40$ $\therefore x^3 = 49 \therefore x = \pm 7$ And $y = \frac{3}{7}$ of $\pm 7 = \pm 3$ Also $x^5 - \frac{49}{49}x^3 = 40 \therefore -\frac{49}{9}x^3 = 40 \text{ and } x = \pm \sqrt{-9} \text{ and } y = \pm \frac{7}{3}\sqrt{-9}$ 15. (2) Solve $\frac{x^3 + y^3}{x + y^3} = \frac{a^2 + b^3}{a + b};  \frac{x^4 + y^4}{x^2 + y^3} = \frac{a^4 + b^4}{a^2 + b^4}$ Let $y = vx$ Then $\frac{x^3 + v^3x^3}{1 + v^3} = \frac{a^2 + b^3}{a + b};  \frac{x(1 + v^4)}{1 + v^3} = \frac{a^4 + b^4}{a^2 + b^5}$ $\therefore \frac{1 + v^5}{1 + v^3} \times \frac{1 + y}{1 + v^3} = \frac{a^4 + b^4}{a^3 + b^5} \times \frac{a + b}{a^2 + b^5}$ $\therefore \frac{1 + v^4}{1 + v^4} \times \frac{1 + y}{1 + v^3} = \frac{a^4 + b^4}{a^3 + b^5} \times \frac{a + b}{a^2 + b^5}$ $\therefore \frac{1 + v^4}{a^4 + b^4 + 2a^4v^4 - a^4v^4 + a^4v^4 - a^4v^4 + a^2v^4 + b^4v^4}{a^4 + b^4}$ $\therefore ab(a - b)^3v^4 - a^4v^4 + a^4v^4 - a^4by^4 - a^2v^4 + a^4v^4 + a^4v^4 - a^4by^4 + a^4v^4 + a^4v^4 - a^4by^4 + a^4v^4 + a^4v^4$   | $\therefore \frac{40}{x-y} = \frac{14}{2}$     | $\frac{15(x-y)}{x^2+y^2}$  |       |
| $\begin{array}{l} \vdots \ 8x^{+} + 8y^{*} = 29 \ (x-y)^{5} \\ \vdots \ 8x^{*} + 8y^{*} = 29x^{*} - 58xy + 2y^{*} = 0 \\ \vdots \ 2x^{*} - 58xy + 2y^{*} = 0 \\ \vdots \ (7x - 3y)(3x - 7y) = 0 \\ \vdots \ y = \frac{3}{7} x \ or \ \frac{7}{3} x \\ \text{But from (1) } x^{*} - y^{*} = 40 \\ \vdots \ x^{*} - \frac{9}{49}x^{*} = 40 \\ \vdots \ x^{*} - \frac{9}{49}x^{*} = 40 \\ \vdots \ x^{*} = 49 \\ \vdots \ x^{*} = \frac{49}{7} \text{ of } \pm 7 = \pm 3 \\ \text{Also } x^{*} - \frac{49}{9}x^{*} = 40 \\ \vdots \ x^{*} = \frac{49}{7}x^{*} = \frac{49}{8}x^{*} = \frac{49}{7}x^{*} = \frac{48}{9}x^{*} = \frac{48}{9}x^{*$   | $\therefore \frac{x^3 + y^3}{x - y} =$         | $\frac{145(x - y)}{40}$  |       |
| $ :: 8x^{3} + 8y^{3} = 29x^{3} - 58xy + 29y^{3}  :: 21x^{3} - 58xy + 21y^{3} = 0  :: (7x - 3y)(3x - 7y) = 0  :: y = \frac{3}{7}x or \frac{7}{3}xBut from (1) x^{2} - y^{3} = 40:: x^{3} - \frac{9}{49}x^{3} = 40:: x^{3} - \frac{49}{9}x^{4} = 40:: x^{3} + \frac{y^{3}}{x + y} = \frac{a^{3} + b^{5}}{a + b^{5}}; \frac{x^{4} + y^{4}}{x^{2} + y^{3}} = \frac{a^{4} + b^{4}}{a^{2} + b^{5}}Let y = xxThen\frac{x^{3} + \frac{y^{3}x}{x + yx}}{x + yx} = \frac{a^{3} + b^{3}}{a + b^{5}}; \frac{x(1 + y^{4})}{1 + y^{3}} = \frac{a^{4} + b^{4}}{a^{2} + b^{3}}:: \frac{1 + y^{5}}{1 + v^{5}} = \frac{a^{3} + b^{3}}{a + b^{5}}; \frac{x(1 + y^{4})}{1 + v^{2}} = \frac{a^{4} + b^{4}}{a^{2} + b^{3}}:: \frac{1 + y^{5}}{1 + v^{5}} \times \frac{1 + y}{1 + v^{5}} = \frac{a^{4} + b^{4}}{a^{3} + b^{3}} \times \frac{a + b}{a^{2} + b^{5}}:: \frac{a^{4} - a^{4}y + 2a^{4}y^{2} - a^{4}y^{3} + b^{4} - b^{4}y + 2a^{5}z^{5}v^{4} - b^{4}y^{3} + b^{4}y^{4}}:: a(a - a^{3})y^{2} - (a^{4} + b^{4})y^{2} - a^{4}y^{3} + b^{4} + b^{4} - b^{4}y^{2} + a^{2}y^{5} + b^{4}y^{4} + b^{4}y^{4} = a^{4} - a^{3}b + 2a^{3}b^{2} - a^{3}b^{2} + b^{4}y^{4} + b^{4}y^{2} = 0:: x^{4} - \frac{a^{4} + b^{4}}{ab(a - b)^{2}}x^{2} + \frac{2(a^{4} + b^{4})y^{2}}{ab(a - b)^{5}}x^{2} + \frac{2(a^{4} + b^{4})y^{2}}{ab(a - b)^{5}}x^{2} + \frac{1}{ab}(a - b)^{2}x^{2} + \frac{1}{ab}(a$  | $\therefore \frac{x^3 + y^3}{x - y} =$         | $\frac{29}{8}(x-y)$  |       |
| $\therefore 21x^3 - 58xy + 21y^3 = 0$<br>$\therefore (7x - 3y)(3x - 7y) = 0$<br>$\therefore y = \frac{3}{7}x \text{ or } \frac{7}{3}x$<br>But from (1) $x^3 - y^3 = 40$<br>$\therefore x^3 - \frac{9}{49}x^3 = 40$<br>$\therefore x^3 = 49 \therefore x = \pm 7$<br>And $y = \frac{3}{7}$ of $\pm 7 = \pm 3$<br>Also $x^5 - \frac{49}{9}x^3 = 40 \therefore -\frac{40}{9}x^3 = 40$ and $x = \pm \sqrt{-9}$ and $y = \pm \frac{7}{3}\sqrt{-9}$<br>15. (2) Solve<br>$\frac{x^3 + y^3}{x + y^3} = \frac{a^3 + b^5}{a + b};  \frac{x^4 + y^4}{x^3 + y^3} = \frac{a^4 + b^4}{a^2 + b^4}$<br>Let $y = vx$<br>Then<br>$\frac{x^3 + v^3x^2}{x + vx} = \frac{a^2 + b^5}{a + b};  \frac{x^4 + x^4v^4}{x^3 + x^5v^2} = \frac{a^4 + b^4}{a^3 + b^4}$<br>$\therefore \frac{x(1 + v^3)}{1 + v^3} = \frac{a^4 + b^5}{a + b};  \frac{x(1 + v^4)}{1 + v^3} = \frac{a^4 + b^4}{a^3 + b^2}$<br>$\therefore \frac{x(1 + v^3)}{1 + v^3} \propto \frac{1 + v}{1 + v^3} = \frac{a^4 + b^4}{a^3 + b^3} \times \frac{a + b}{a^3 + b^3}$<br>$\therefore \frac{1 + v^4}{1 + v^3} \times \frac{1 + v}{1 + v^3} = \frac{a^4 + b^4}{a^3 + b^3} \times \frac{a + b}{a^3 + b^3}$<br>$\therefore \frac{1 + v^4}{a^4 - a^4 v + 2a^4 v^3 - a^4 v^3 + a^4 v + a^4 b^4 - b^4 v + a^4 b^2 v^4 + a^4 b^4 v^4 + a^4 b^4 - b^4 v + a^4 b^2 v^4 + b^4 b^4 v + a^4 b^2 v^4 + b^4 v^4 + a^4 b^4 a^4 b^4 $   |  |  |       |
| $\therefore (7x - 3y)(3x - 7y) = 0$<br>$\therefore y = \frac{3}{7}x \text{ or } \frac{7}{3}x$<br>But from (1) $x^2 - y^2 = 40$<br>$\therefore x^2 - \frac{9}{49}x^3 = 40$<br>$\frac{40}{49}x^4 = 40$<br>$\frac{40}{49}x^4 = 40$<br>$\therefore x^2 - 49 \therefore x = \pm 7$<br>And $y = \frac{3}{7}$ of $\pm 7 = \pm 3$<br>Also $x^5 - \frac{49}{9}x^4 = 40$ $\therefore -\frac{40}{9}x^4 = 40$ and $x = \pm \sqrt{-9}$ and $y = \pm \frac{7}{3}\sqrt{-9}$<br>15. (2) Solve<br>$\frac{x^3 + y^5}{x + y^5} = \frac{a^2 + b^3}{a + b^5};  \frac{x^4 + y^4}{x^2 + y^2} = \frac{a^4 + b^4}{a^2 + b^5}$<br>Let $y = vx$<br>Then<br>$\frac{x^3 + v^3x^2}{x + vx} = \frac{a^2 + b^2}{a + b^5};  \frac{x^4 + x^4v^4}{x^2 + x^2v^2} = \frac{a^4 + b^4}{a^2 + b^5}$<br>$\therefore \frac{x(1 + v^3)}{x + vx} = \frac{a^2 + b^2}{a + b^5};  \frac{x(1 + v^4)}{1 + v^3} = \frac{a^4 + b^4}{a^2 + b^5}$<br>$\therefore \frac{1 + v^4}{1 + v^5} \times \frac{1 + v}{1 + v^2} = \frac{a^4 + b^4}{a^4 + b^4} \times \frac{a + b}{a^2 + b^5}$<br>$\therefore \frac{1 + v^4}{a^4 - a^4v + 2a^4v^2 - a^4v^2 + a^4v^4 + b^4 - b^4v + 2a^4v^4 - a^5v^4 + a^5v^4 + b^4v^4}{a^4 - b^5)^2 x^4 - a^5v^4 + b^4v^4}$<br>$\therefore a^4 - a^4v + 2a^4v^2 - a^4v^2 + a^4v^4 + a^5v^4 + $   |  |  |       |
| But from (1) $x^2 - y^2 = 40$<br>$\therefore x^3 - \frac{9}{49}x^2 = 40$<br>$\frac{40}{49}x^4 = 40$<br>$\therefore x^3 = 49 \therefore x = \pm 7$<br>And $y = \frac{3}{7}$ of $\pm 7 = \pm 3$<br>Also $x^4 - \frac{49}{9}x^4 = 40 \therefore -\frac{40}{9}x^3 = 40$ and $x = \pm \sqrt{-9}$ and $y = \pm \frac{7}{3}\sqrt{-9}$<br>15. (2) Solve<br>$\frac{x^3 + y^3}{x + y} = \frac{a^3 + b^5}{a + b}$ ; $\frac{x^4 + y^4}{x^2 + y^2} = \frac{a^4 + b^4}{a^2 + b^5}$<br>Let $y = xx$<br>Then<br>$\frac{x^3 + v^3x^3}{1 + v} = \frac{a^2 + b^2}{a + b}$ ; $\frac{x^4 + x^4v^4}{1 + v^2} = \frac{a^4 + b^4}{a^2 + b^5}$<br>$\therefore \frac{x(1 + v^3)}{1 + v} = \frac{a^3 + b^2}{a + b}$ ; $\frac{x(1 + v^4)}{1 + v^3} = \frac{a^4 + b^4}{a^2 + b^5}$<br>$\therefore \frac{x(1 + v^3)}{1 + v^3} \times \frac{1 + v}{1 + v^2} = \frac{a^4 + b^4}{a^2 + b^5} \times \frac{a + b}{a^2 + b^5}$<br>$\therefore \frac{1 + v^4}{1 + v^3} \times \frac{1 + v}{1 + v^2} = \frac{a^4 + b^4}{a^2 + b^5} \times \frac{a + b}{a^2 + b^5}$<br>$\therefore \frac{a^4 - a^4v + 2a^4v^3 - a^4v^3 + a^4v^4 + b^4 - b^4v + 2b^4v^4 - b^4v^2 + b^4v^4}{a^4 - a^4v^4 + a^4v^5 - a^4v^3 + a^4v^4 + b^4 - b^4v + 2a^4v^4 - a^4bv^4 + b^4v^4 + b^4$   |  | • •  |       |
| $\therefore x^{3} - \frac{9}{49}x^{3} = 40$ $\frac{40}{49}x^{3} = 40$ $\therefore x^{3} = 49 \therefore x = \pm 7$ And $y = \frac{3}{7}$ of $\pm 7 = \pm 3$ Also $x^{5} - \frac{49}{9}x^{3} = 40$ .<br>$\therefore -\frac{49}{9}x^{3} = 40$ $\therefore -\frac{40}{9}x^{3} = 40$ $\therefore -\frac{40}{9}x^{3} = 40$ and $x = \pm \sqrt{-9}$ and $y = \pm \frac{7}{3}\sqrt{-9}$ 15. (2) Solve $\frac{x^{3} + y^{3}}{x + y^{3}} = \frac{a^{3} + b^{5}}{a + b};  \frac{x^{4} + y^{4}}{x^{2} + y^{2}} = \frac{a^{4} + b^{4}}{a^{2} + b^{5}}$ Let $y = vx$ Then $\frac{x^{3} + v^{2}x^{2}}{x + vx} = \frac{a^{2} + b^{3}}{a + b};  \frac{x^{4} + x^{4}v^{4}}{x^{2} + x^{2}v^{2}} = \frac{a^{4} + b^{4}}{a^{3} + b^{5}}$ $\therefore \frac{x(1 + v^{3})}{1 + v} = \frac{a^{3} + b^{3}}{a + b};  \frac{x(1 + v^{4})}{1 + v^{3}} = \frac{a^{4} + b^{4}}{a^{3} + b^{5}}$ $\therefore \frac{x(1 + v^{4})}{1 + v^{3}} \times \frac{1 + v}{1 + v^{2}} = \frac{a^{4} + b^{4}}{a^{3} + b^{5}}$ $\therefore \frac{1 + v^{4}}{1 + v^{3}} \times \frac{1 + v}{1 + v^{2}} = \frac{a^{4} + b^{4}}{a^{3} + b^{5}}$ $\therefore \frac{1 + v^{4}}{1 + v^{3}} \times \frac{1 + v}{1 + v^{2}} = \frac{a^{4} + b^{4}}{a^{3} + b^{5}}$ $\therefore \frac{1 + v^{4}}{1 + v^{3}} = \frac{a^{4} + b^{4}}{(a^{2} - b^{2})^{2} + a^{2}v^{2} + a^{2}v^{2$  | $\therefore y = \frac{3}{7}x \text{ or }$      | $\frac{7}{3}x$   |       |
| $\frac{40}{49}x^3 = 40$ $\therefore x^2 = 49 \therefore x = \pm 7$ And $y = \frac{3}{7}$ of $\pm 7 = \pm 3$ Also $x^3 - \frac{49}{9}x^3 = 40 \therefore -\frac{40}{9}x^3 = 40$ and $x = \pm \sqrt{-9}$ and $y = \pm \frac{7}{3}\sqrt{-9}$ 15. (2) Solve $\frac{x^3 + y^3}{x + y} = \frac{a^2 + b^2}{a + b};  \frac{x^4 + y^4}{x^2 + y^2} = \frac{a^4 + b^4}{a^2 + b^5}$ Let $y = vx$ Then $\frac{x^3 + v^2x^3}{1 + v} = \frac{a^2 + b^2}{a + b};  \frac{x^4 + x^4v^4}{x^2 + y^2} = \frac{a^4 + b^4}{a^2 + b^5}$ $\therefore \frac{x(1 + v^3)}{1 + v} = \frac{a^3 + b^3}{a + b};  \frac{x(1 + v^4)}{1 + v^2} = \frac{a^4 + b^4}{a^2 + b^2}$ $\therefore \frac{x(1 + v^3)}{1 + v} = \frac{a^3 + b^3}{a + b};  \frac{x(1 + v^4)}{1 + v^2} = \frac{a^4 + b^4}{a^2 + b^2}$ $\therefore \frac{1 + v^4}{1 + v^3} \times \frac{1 + v}{1 + v^2} = \frac{a^4 + b^4}{a^2 + b^4} \times \frac{a + b}{a^2 + b^2}$ $\therefore \frac{1 + v^4}{a^4 - a^4v + 2a^4v^3 - a^4v^3 + a^4v^4 + b^4 - b^4v + 2a^4v^3 + b^4v^4}{a^4 + b^4 - a^4bv^4 + 2a^2v^2 - a^4v^3 + b^4v^4 + b^4 - b^4v + 2a^4v^2 - a^4v + b^4v^4 + b^4 - b^4v + 2a^4v^2 - a^4v + b^4v^4 + b^4 - b^4v + 2a^4v^2 - a^4v + b^4v^4 + b^4 - b^4v + 2a^4v^2 - a^4v + b^4v^4 + b^4 - b^4v + 2a^4v^2 - a^4v + b^4v^4 + b^4 - b^4v + 2a^4v^2 - a^4v + b^4v^4 + b^4 - b^4v + b^4v^4 + b^4v^$   | But from (1) x* -                              | $-y^{2} = 40$  |       |
| $x^{27} = 49 \therefore x = \pm 7$ And $y = \frac{3}{7}$ of $\pm 7 = \pm 3$ Also $x^{5} - \frac{49}{9}x^{9} = 40 \therefore -\frac{40}{9}x^{9} = 40$ and $x = \pm \sqrt{-9}$ and $y = \pm \frac{7}{3}\sqrt{-9}$ 15. (2) Solve $\frac{x^{3} + y^{3}}{x + y^{3}} = \frac{a^{3} + b^{5}}{a + b^{5}};  \frac{x^{4} + y^{4}}{x^{2} + y^{3}} = \frac{a^{4} + b^{4}}{a^{3} + b^{5}}$ Let $y = vx$ Then $\frac{x^{3} + v^{2}x^{2}}{x + vx} = \frac{a^{2} + b^{2}}{a + b};  \frac{x^{4} + x^{4}v^{4}}{x^{3} + x^{2}v^{3}} = \frac{a^{4} + b^{4}}{a^{3} + b^{5}}$ $\therefore \frac{x(1 + v^{2})}{1 + v} = \frac{a^{2} + b^{2}}{a + b};  \frac{x(1 + v^{4})}{1 + v^{3}} = \frac{a^{4} + b^{4}}{a^{3} + b^{2}}$ $\therefore \frac{x(1 + v^{4})}{1 + v^{3}} \times \frac{1 + v}{1 + v^{2}} = \frac{a^{4} + b^{4}}{a^{3} + b^{3}} \times \frac{a + h}{a^{3} + b^{2}}$ $\therefore \frac{1 + v^{4}}{1 + v^{3}} \times \frac{1 + v}{1 + v^{2}} = \frac{a^{4} + b^{4}}{a^{3} + b^{3}} \times \frac{a + h}{a^{3} + b^{2}}$ $\therefore \frac{1 + v^{4}}{a^{4} - a^{4}v + 2a^{4}v^{3} - a^{4}v^{3} + a^{4}v^{4} + b^{4} - b^{4}v + 2b^{4}v^{4} - b^{4}v^{3} + b^{4}v^{4}$ $\Rightarrow a^{4} - a^{4}v + 2a^{4}v^{3} - a^{4}v^{3} + a^{4}v^{4} - a^{3}bv^{4} + 2a^{2}b^{2}v^{4} - a^{3}bv^{4} + 2a^{2}b^{2}v^{4} - a^{3}bv^{4} + 2a^{2}b^{2}v^{4} - a^{4}bv^{4} = a^{4}b^{4} + b^{4}v^{5} - a^{4}b^{4} + b^{4}v^{5} - a^{4}b^{4} + b^{4}b^{2} - a^{4}b^{4}b^{2} + a^{4}b^{4}b^{2} + a^{4}b^{4}b^{4} + b^{4}b^{4} + b^{4}b^{4}b^{4} + b^{4}b^{4}b^{4} + b^{4}b^{4}b^{4} + b^{4}b^{4}b^{4} + b^{4}b^{2}b^{4}b^{4} + b^{4}b^{4}b^{4} + b^{4}b^{4}b^{4}b^{4} + b^{4}b^{4}b^{4}b^{4} + b^{4}b^{4}b^{4}b^{4} + b^{4}b^{4}b^{4}b^{4} + b^{4}b^{4}b^{4}b^{4} + b^{4}b^{4}b^{4}b^{4} + b^{4}b^{4}b^{4}b^{4}b^{4}b^{4}b^{4}b^{4}$  | $\therefore x^3 = \frac{9}{49}x^3 =$           | = 40   |       |
| And $y = \frac{3}{7}$ of $\pm 7 = \pm 3$<br>Also $x^5 - \frac{49}{9}x^8 = 40$ $\therefore -\frac{40}{9}x^8 = 40$ and $x = \pm \sqrt{-9}$ and $y = \pm \frac{7}{3}\sqrt{-9}$<br>15. (2) Solve<br>$\frac{x^3 + y^5}{x + y} = \frac{a^3 + b^5}{a + b};  \frac{x^4 + y^4}{x^3 + y^3} = \frac{a^4 + b^4}{a^3 + b^5}$<br>Let $y = vx$<br>Then<br>$\frac{x^3 + v^3 x^3}{x + vx} = \frac{a^2 + b^2}{a + b};  \frac{x^4 + x^4 v^4}{x^3 + x^2 v^3} = \frac{a^4 + b^4}{a^3 + b^5}$<br>$\therefore \frac{x(1 + v^3)}{1 + v} = \frac{a^3 + b^2}{a + b};  \frac{x(1 + v^4)}{1 + v^2} = \frac{a^4 + b^4}{a^3 + b^3}$<br>$\therefore \frac{x(1 + v^3)}{1 + v^3} \times \frac{1 + v}{1 + v^2} = \frac{a^4 + b^4}{a^3 + b^3} \times \frac{a + b}{a^2 + b^2}$<br>$\therefore \frac{1 + v^4}{1 + v^3} \times \frac{1 + v}{1 + v^2} = \frac{a^4 + b^4}{a^3 + b^3} \times \frac{a + b}{a^2 + b^2}$<br>$\therefore \frac{a^4 - a^4v + 2a^4v^3 - a^4v^3 + a^4v^4 + b^4 - b^4v + 2b^4v^4 - b^4v^3 + b^4v^4}{a^3 - a^{4}v^2 + a^{4}v^3 + a^{4}v^4 - a^{4}bv^4 + 2a^{2}b^{2}v^4 - ab^{2}y^4 + b^{4}v^4}{a^4(a - b)^2v^4 - (a^4 + b^4)v^2 + 2(a^4 + b^4)v^2 - (a^4 + b^4)v^2$  | $\frac{40}{49}x^{2} = 40$                      |  |       |
| Also $x^{*} - \frac{49}{9}x^{9} = 40$ , $\cdot - \frac{40}{9}x^{9} = 40$ and $x = \pm \sqrt{-9}$ and $y = \pm \frac{7}{3}\sqrt{-9}$<br>15. (2) Solve<br>$\frac{x^{9} + y^{5}}{x + y} = \frac{a^{9} + b^{7}}{a + b^{7}}$ ; $\frac{x^{4} + y^{6}}{x^{5} + y^{3}} = \frac{a^{4} + b^{6}}{a^{2} + b^{7}}$<br>Let $y = vx$<br>Then<br>$\frac{x^{8} + v^{2}x^{2}}{x + vx} = \frac{a^{2} + b^{2}}{a + b^{7}}$ ; $\frac{x^{4} + x^{4}v^{4}}{x^{9} + x^{2}v^{9}} = \frac{a^{4} + b^{6}}{a^{3} + b^{3}}$<br>$\therefore \frac{x(1 + v^{3})}{1 + v} = \frac{a^{4} + b^{3}}{a + b^{7}}$ ; $\frac{x(1 + v^{4})}{1 + v^{3}} = \frac{a^{4} + b^{4}}{a^{3} + b^{2}}$<br>$\therefore \frac{1 + v^{4}}{1 + v^{5}} \times \frac{1 + v}{1 + v^{2}} = \frac{a^{4} + b^{4}}{a^{2} + b^{2}} \times \frac{a + b}{a^{2} + b^{2}}$<br>$\therefore \frac{1 + v^{4}}{(1 - v + v^{2})(1 + v^{3})} = \frac{a^{4} + b^{4}}{(a^{2} - ab + b^{2})(a^{2} + b^{2})}$<br>$\therefore a^{4} - a^{4}v + 2a^{4}v^{2} - a^{4}v^{3} + a^{4}v^{4} - b^{5}v + 2a^{2}b^{2}v^{4} - b^{5}v^{3} + b^{4}v^{4}$<br>$\therefore ab(a - b)^{2}v^{4} - (a^{4} + b^{4})v^{3} + 2(a^{4} + b^{4})v^{2} - (a^{4} + i^{4})v + ab(a - b)^{2}z^{7} + i = 0$<br>$\therefore v^{4} - \frac{a^{4} + b^{4}}{ab(a - b)^{2}}v^{3} + \frac{2(a^{4} + b^{4})}{ab(a - b)^{2}}v^{2} - \frac{a^{4} + b^{4}}{ab(a - b)^{2}}$ . $\frac{1}{v} + \frac{1}{v^{3}} = 0$   | $\therefore x^{*} = 49 \therefore x$           | = 土 7  |       |
| 15. (2) Solve<br>$\frac{x^{3} + y^{5}}{x + y} = \frac{a^{3} + b^{2}}{a + b};  \frac{x^{4} + y^{4}}{x^{3} + y^{3}} = \frac{a^{4} + b^{4}}{a^{2} + b^{3}}$ Let $y = vx$<br>Then<br>$\frac{x^{2} + v^{3}x^{2}}{x + vx} = \frac{a^{2} + b^{2}}{a + b};  \frac{x^{4} + x^{4}v^{4}}{x^{5} + x^{5}v^{3}} = \frac{a^{4} + b^{4}}{a^{3} + b^{5}}$ $\therefore \frac{x(1 + v^{2})}{1 + v} = \frac{a^{5} + b^{5}}{a + b};  \frac{x(1 + v^{4})}{1 + v^{3}} = \frac{a^{4} + b^{4}}{a^{3} + b^{5}}$ $\therefore \frac{x(1 + v^{2})}{1 + v^{3}} \times \frac{1 + v}{1 + v^{2}} = \frac{a^{4} + b^{4}}{a^{3} + b^{5}} \times \frac{a + b}{a^{3} + b^{5}}$ $\therefore \frac{1 + v^{4}}{1 + v^{3}} \times \frac{1 + v}{1 + v^{2}} = \frac{a^{4} + b^{4}}{a^{3} + b^{5}} \times \frac{a + b}{a^{2} + b^{5}}$ $\therefore \frac{1 + v^{4}}{(1 - v + v^{2})(1 + v^{3})} = \frac{a^{4} + b^{4}}{(a^{2} - ab + b^{2})(a^{2} + b^{2})}$ $\therefore a^{4} - a^{4}v + 2a^{4}v^{3} - a^{4}v^{3} + a^{4}v^{4} - a^{3}bv^{4} + 2a^{2}b^{3}v^{4} - b^{4}v^{4} + b^{4}v^{4}$ $= a^{4} - a^{3}b + 2a^{3}b^{3} - ab^{3} + b^{4} + a^{4}v^{4} - a^{3}bv^{4} + 2a^{2}b^{3}v^{4} - ab^{3}v^{4} + b^{4}v^{4}$ $\therefore ab(a - b)^{2}v^{4} - (a^{4} + b^{4})v^{3} - 2(a^{4} + b^{4})v^{2} - (a^{4} + i^{4})v + ab(a - b)^{2} = 0$ $\therefore v^{4} - \frac{a^{4} + b^{4}}{ab(a - b)^{2}}v^{3} + \frac{2(a^{4} + b^{4})}{ab(a - b)^{2}}v^{3} - \frac{a^{4} + b^{4}}{ab(a - b)^{2}}v^{4} - \frac{1}{v} + \frac{1}{v^{2}} = 0$   | And $y = \frac{3}{7}$ of $\exists$             | $\pm 7 = \pm 3$  |       |
| $\frac{x^{2} + y^{3}}{x + y} = \frac{a^{2} + b^{2}}{a + b};  \frac{x^{4} + y^{4}}{x^{2} + y^{3}} = \frac{a^{4} + b^{4}}{a^{2} + b^{3}}$ Let $y = vx$<br>Then<br>$\frac{x^{2} + v^{2}x^{2}}{x + vx} = \frac{a^{2} + b^{2}}{a + b};  \frac{x^{4} + x^{4}v^{4}}{x^{3} + x^{2}v^{2}} = \frac{a^{4} + b^{4}}{a^{3} + b^{2}}$ $\therefore \frac{x(1 + v^{3})}{1 + v} = \frac{a^{3} + b^{2}}{a + b};  \frac{x(1 + v^{4})}{1 + v^{3}} = \frac{a^{4} + b^{4}}{a^{3} + b^{2}}$ $\therefore \frac{1 + v^{4}}{1 + v^{3}} \times \frac{1 + v}{1 + v^{2}} = \frac{a^{4} + b^{4}}{a^{3} + b^{3}} \times \frac{a + b}{a^{2} + b^{2}}$ $\therefore \frac{1 + v^{4}}{(1 - v + v^{2})(1 + v^{3})} = \frac{a^{4} + b^{4}}{(a^{2} - ab + b^{2})(a^{2} + b^{2})}$ $\therefore a^{4} - a^{4}v + 2a^{4}v^{2} - a^{4}v^{3} + a^{4}v^{4} + b^{4} - b^{4}v + 2a^{2}b^{2}v^{4} - a^{5}v^{4} + b^{4}v^{4}$ $= a^{4} - a^{3}b + 2a^{2}b^{3} - ab^{3} + b^{4} + a^{4}v^{4} - a^{3}bv^{4} + 2a^{2}b^{2}v^{4} - ab^{2}v^{4} + b^{4}v^{4}$ $\therefore ab(a - b)^{2}v^{4} - (a^{4} + b^{4})v^{2} + 2(a^{4} + b^{4})v^{2} - (a^{4} + i^{4})v + iab(a - b)^{2} = 0$ $\therefore v^{4} - \frac{a^{4} + b^{4}}{ab(a - b)^{2}}v^{3} + \frac{2(a^{4} + b^{4})}{ab(a - b)^{2}}v^{3} - \frac{a^{4} + b^{4}}{ab(a - b)^{2}} \cdot \frac{1}{v} + \frac{1}{v^{3}} = 0$   |  | = 40 : $-\frac{40}{9}x^2 = 40$ and $x = \pm \sqrt{-9}$ and $y = \pm \frac{7}{3}\sqrt{-9}$                    |       |
| Let $y = vx$<br>Then<br>$\frac{x^2 + v^2 x^2}{x + vx} = \frac{a^2 + b^2}{a + b}$ ; $\frac{x^4 + x^4 v^4}{x^5 + x^2 v^2} = \frac{a^4 + b^4}{a^2 + b^2}$<br>$\therefore \frac{x(1 + v^2)}{1 + v} = \frac{a^3 + b^2}{a + b}$ ; $\frac{x(1 + v^4)}{1 + v^2} = \frac{a^4 + b^4}{a^3 + b^2}$<br>$\therefore \frac{1 + v^4}{1 + v^3} \times \frac{1 + v}{1 + v^2} = \frac{a^4 + b^4}{a^3 + b^2} \times \frac{a + b}{a^2 + b^2}$<br>$\therefore \frac{1 + v^4}{(1 - v + v^2)(1 + v^3)} = \frac{a^4 + b^4}{(a^2 - ab + b^2)(a^2 + b^2)}$<br>$\therefore a^4 - a^4 v + 2a^4 v^2 - a^4 v^3 + a^4 v^4 + b^4 - b^4 v + 2b^4 v^4 - a^3 v^4 + b^4 v^4$<br>$= a^4 - a^3 b + 2a^3 v^3 - a^5 v^3 + b^4 + a^4 v^4 - a^3 bv^4 + 2a^2 b^2 v^4 - ab^3 v^4 + b^4 v^4}$<br>$\therefore ab(a - b)^2 v^4 - (a^4 + b^4)v^3 + 2(a^4 + b^4)v^2 - (a^4 + i^4)v + ab(a - b)^2 = 0$<br>$\therefore v^4 - \frac{a^4 + b^4}{ab(a - b)^2}v^3 + \frac{2(a^4 + b^4)}{ab(a - b)^2}v^3 - \frac{a^4 + b^4}{ab(a - b)^2}$ . $\frac{1}{v} + \frac{1}{v^3} = 0$  |  |  |       |
| Then<br>$\frac{x^{2} + v^{3}x^{2}}{x + vx} = \frac{a^{2} + b^{2}}{a + b};  \frac{x^{4}}{x^{8}} + \frac{x^{4}v^{4}}{x^{2}v^{3}} = \frac{a^{4} + b^{4}}{a^{3} + b^{3}}$ $\therefore \frac{x(1 + v^{3})}{1 + v} = \frac{a^{3} + b^{2}}{a + b};  \frac{x(1 + v^{4})}{1 + v^{3}} = \frac{a^{4} + b^{4}}{a^{3} + b^{2}}$ $\therefore \frac{1 + v^{4}}{1 + v^{3}} \times \frac{1 + v}{1 + v^{2}} = \frac{a^{4} + b^{4}}{a^{3} + b^{3}} \times \frac{a + b}{a^{2} + b^{2}}$ $\therefore \frac{1 + v^{4}}{(1 - v + v^{2})(1 + v^{2})} = \frac{a^{4} + b^{4}}{(a^{2} - ab + b^{2})(a^{2} + b^{2})}$ $\therefore a^{4} - a^{4}v + 2a^{4}v^{2} - a^{4}v^{3} + a^{4}v^{4} + b^{4} - b^{4}v + 2b^{4}v^{4} - b^{4}v^{3} + b^{4}v^{4}$ $= a^{4} - a^{3}b + 2a^{2}b^{3} - ab^{3} + b^{4} + a^{4}v^{4} - a^{3}bv^{4} + 2a^{2}b^{2}v^{4} - ab^{3}v^{4} + b^{4}v^{4}$ $\therefore ab(a - b)^{2}v^{4} - (a^{4} + b^{4})v^{3} + 2(a^{4} + b^{4})v^{2} - (a^{4} + i^{4})v + ab(a - b)^{2} = 0$ $\therefore v^{4} - \frac{a^{4} + b^{4}}{ab(a - b)^{2}}v^{3} + \frac{2(a^{4} + b^{4})}{ab(a - b)^{2}}v^{2} - \frac{a^{4} + b^{4}}{ab(a - b)^{2}}v^{2} + \frac{1}{a^{2}}v^{2} = 0$   | $\frac{x^3+y^3}{x+y}=\frac{a^3}{a}$            | $\frac{+b^{*}}{+b} ; \frac{x^{*}+y^{*}}{x^{2}+y^{3}} = \frac{a^{*}+b^{*}}{a^{2}+b^{*}}$                      |       |
| $\frac{x^{2} + v^{3}x^{2}}{x + vx} = \frac{a^{2} + b^{2}}{a + b};  \frac{x^{4}}{x^{8}} + \frac{x^{4}v^{4}}{x^{2}v^{3}} = \frac{a^{4} + b^{4}}{a^{3} + b^{3}}$ $\therefore \frac{x(1 + v^{3})}{1 + v} = \frac{a^{3} + b^{2}}{a + b};  \frac{x(1 + v^{4})}{1 + v^{3}} = \frac{a^{4} + b^{4}}{a^{3} + b^{2}}$ $\therefore \frac{1 + v^{4}}{1 + v^{3}} \times \frac{1 + v}{1 + v^{2}} = \frac{a^{4} + b^{4}}{a^{3} + b^{3}} \times \frac{a + b}{a^{2} + b^{2}}$ $\therefore \frac{1 + v^{4}}{(1 - v + v^{2})(1 + v^{2})} = \frac{a^{4} + b^{4}}{(a^{2} - ab + b^{2})(a^{2} + b^{2})}$ $\therefore a^{4} - a^{4}v + 2a^{4}v^{2} - a^{4}v^{3} + a^{4}v^{4} + b^{4} - b^{4}v + 2a^{4}v^{3} + b^{4}v^{4}$ $\Rightarrow a^{4} - a^{4}v + 2a^{4}v^{2} - a^{4}v^{3} + a^{4}v^{4} - a^{3}bv^{4} + 2a^{2}b^{2}v^{4} - ab^{3}v^{4} + b^{4}v^{4}$ $\Rightarrow ab(a - b)^{2}v^{4} - (a^{4} + b^{4})v^{3} + 2(a^{4} + b^{4})v^{2} - (a^{4} + i^{4})v + ab(a - b)^{2} = 0$ $\therefore v^{4} - \frac{a^{4} + b^{4}}{ab(a - b)^{2}}v^{3} + \frac{2(a^{4} + b^{4})}{ab(a - b)^{2}}v^{2} - \frac{a^{4} + b^{4}}{ab(a - b)^{2}} \cdot \frac{1}{v} + \frac{1}{v^{3}} = 0$   | •  |  |       |
| $\therefore \frac{x(1+v^{2})}{1+v} = \frac{a^{3}+b^{2}}{a+b};  \frac{x(1+v^{4})}{1+v^{3}} = \frac{a^{4}+b^{4}}{a^{3}+b^{2}}$ $\therefore \frac{1+v^{4}}{1+v^{3}} \times \frac{1+v}{1+v^{2}} = \frac{a^{4}+b^{4}}{a^{3}+b^{3}} \times \frac{a+b}{a^{2}+b^{2}}$ $\therefore \frac{1+v^{4}}{(1-v+v^{2})(1+v^{2})} = \frac{a^{4}+b^{4}}{(a^{2}-ab+b^{2})(a^{2}+b^{2})}$ $\therefore a^{4}-a^{4}v+2a^{4}v^{2}-a^{4}v^{3}+a^{4}v^{4}+b^{4}-b^{4}v+2b^{4}v^{4}-b^{4}v^{2}+b^{4}v^{4}$ $= a^{4}-a^{2}b+2a^{3}b^{3}-ab^{3}+b^{4}+a^{4}v^{4}-a^{3}bv^{4}+2a^{2}b^{2}v^{4}-ab^{3}v^{4}+b^{4}v^{4}$ $\Rightarrow ab(a-b)^{2}v^{4}-(a^{4}+b^{4})v^{3}+2(a^{4}+b^{4})v^{2}-(a^{4}+i^{4})v+ab(a-b)^{2}=0$ $\therefore v^{4}-\frac{a^{4}+b^{4}}{ab(a-b)^{2}}v^{3}+\frac{2(a^{4}+b^{4})}{ab(a-b)^{2}}v^{3}-\frac{a^{4}+b^{4}}{ab(a-b)^{2}},  \frac{1}{v}+\frac{1}{v^{2}}=0$  |  | $\frac{x^2+b^2}{a+b}; \frac{x^4+x^4v^4}{x^3+x^2v^3} = \frac{a^4+b^4}{a^3+b^3}$                               |       |
| $\therefore \frac{1+v^{4}}{1+v^{3}} \times \frac{1+v}{1+v^{2}} = \frac{a^{4}+b^{4}}{a^{2}+b^{3}} \times \frac{a+b}{a^{2}+b^{2}}$ $\therefore \frac{1+v^{4}}{(1-v+v^{2})(1+v^{2})} = \frac{a^{4}+b^{4}}{(a^{2}-ab+b^{2})(a^{2}+b^{2})}$ $\therefore a^{4}-a^{4}v+2a^{4}v^{3}-a^{4}v^{3}+a^{4}v^{4}+b^{4}-b^{4}v+2b^{4}v^{4}-b^{6}v^{2}+b^{4}v^{4}$ $= a^{4}-a^{3}b+2a^{3}b^{3}-ab^{3}+b^{4}+a^{4}v^{4}-a^{3}bv^{4}+2a^{2}b^{2}v^{4}-ab^{3}v^{4}+b^{4}v^{4}$ $\therefore ab(a-b)^{2}v^{4}-(a^{4}+b^{4})v^{3}+2(a^{4}+b^{4})v^{3}-(a^{4}+t^{4})v+ab(a-b)^{2}=0$ $\therefore v^{4}-\frac{a^{4}+b^{6}}{ab(a-b)^{2}}v^{3}+\frac{2}{ab}\frac{(a^{4}+b^{4})}{(a-b)^{2}}v^{3}-\frac{a^{4}+b^{4}}{ab}\frac{(a-b)^{3}}{(a-b)^{3}}z^{2}+1=0$ $\therefore v^{9}-\frac{a^{4}+b^{6}}{ab(a-b)^{2}}v+\frac{2(a^{4}+b^{4})}{ab}\frac{(a-b)^{3}}{(a-b)^{2}}-\frac{a^{4}+b^{4}}{ab}\frac{(a-b)^{3}}{(a-b)^{2}}\cdot \frac{1}{v}+\frac{1}{v^{3}}=0$  |  | -9 · 18 · · · · · · · · · · · · · · · · ·  |       |
| $ \frac{1+v^{4}}{(1-v+v^{2})(1+v^{2})} = \frac{a^{4}+b^{4}}{(a^{2}-ab+b^{2})(a^{2}+b^{2})} $ $ \frac{a^{4}-a^{4}v+2a^{4}v^{2}-a^{4}v^{3}+a^{4}v^{4}+b^{6}-b^{4}v+2b^{4}v^{4}-b^{4}v^{2}+b^{4}v^{4}}{a^{4}-a^{2}b+2a^{2}b^{2}-ab^{3}+b^{4}+a^{4}v^{4}-a^{2}bv^{4}+2a^{2}b^{2}v^{4}-ab^{3}v^{4}+b^{4}v^{4} $ $ \frac{a^{4}-a^{2}b+2a^{2}b^{2}-ab^{3}+b^{4}+a^{4}v^{4}-a^{2}bv^{4}+2a^{2}b^{2}v^{4}-ab^{3}v^{4}+b^{4}v^{4} $ $ \frac{a^{6}-b^{3}}{ab(a-b)^{2}v^{4}-(a^{4}+b^{4})v^{3}+2(a^{4}+b^{4})v^{2}-(a^{4}+b^{4})v+ab(a-b)^{2}=0 $ $ \frac{a^{6}+b^{6}}{ab(a-b)^{2}}v^{3}+\frac{2(a^{4}+b^{4})}{ab(a-b)^{2}}v^{3}-\frac{a^{4}-b^{4}}{ab(a-b)^{2}}v^{2}v^{4}+1=0 $ $ \frac{a^{6}+b^{6}}{ab(a-b)^{2}}v+\frac{2(a^{4}+b^{4})}{ab(a-b)^{2}}-\frac{a^{4}+b^{4}}{ab(a-b)^{2}},  \frac{1}{v}+\frac{1}{v^{2}}=0 $  | ·  |  |       |
| $\therefore a^{4} - a^{4}v + 2a^{4}v^{2} - a^{4}v^{2} + a^{4}v^{4} + b^{4} - b^{4}v + 2b^{4}v^{4} - b^{4}v^{2} + b^{4}v^{4}$ $= a^{4} - a^{2}b + 2a^{2}b^{2} - ab^{2} + b^{4} + a^{4}v^{4} - a^{3}bv^{4} + 2a^{2}b^{2}v^{4} - ab^{3}v^{4} + b^{4}v^{4}$ $\therefore ab(a-b)^{2}v^{4} - (a^{4}+b^{4})v^{2} + 2(a^{4}+b^{4})v^{2} - (a^{4}+b^{4})v + ab(a-b)^{2} = 0$ $\therefore v^{4} - \frac{a^{4}+b^{4}}{ab(a-b)^{2}}v^{3} + \frac{2(a^{4}+b^{4})}{ab(a-b)^{2}}v^{3} - \frac{a^{4}+b^{4}}{ab(a-b)^{2}}v^{7} + 1 = 0$ $\therefore v^{9} - \frac{a^{4}+b^{4}}{ab(a-b)^{2}}v + \frac{2(a^{4}+b^{4})}{ab(a-b)^{2}} - \frac{a^{4}+b^{4}}{ab(a-b)^{2}},  \frac{1}{v} + \frac{1}{v^{2}} = 0$   |  |  |       |
| $= a^{4} - a^{2}b + 2a^{2}b^{2} - ab^{3} + b^{4} + a^{4}v^{6} - a^{3}bv^{6} + 2a^{2}b^{2}v^{4} - ab^{3}v^{6} + b^{6}v^{4}$<br>$\therefore ab(a-b)^{2}v^{4} - (a^{4}+b^{4})v^{3} + 2(a^{4}+b^{4})v^{2} - (a^{4}+i^{4})v + ab(a-b)^{2} = 0$<br>$\therefore v^{4} - \frac{a^{4}+b^{4}}{ab(a-b)^{2}}v^{3} + \frac{2}{ab}\frac{(a^{4}+b^{4})}{(a-b)^{2}}v^{3} - \frac{a^{4}+b^{4}}{ab}\frac{(a^{2}-b)^{2}}{(a-b)^{2}}v^{2} + \frac{1}{ab}\frac{(a^{2}-b)^{2}}{(a-b)^{2}}v^{3} + \frac{a^{4}+b^{4}}{ab}\frac{(a^{2}-b)^{2}}{(a-b)^{2}}v^{3} - \frac{a^{4}+b^{4}}{ab}\frac{(a^{2}-b)^{2}}{(a-b)^{2}}v^{2} + \frac{1}{v}\frac{1}{v^{2}} = 0$  |  |  |       |
| $\therefore v^{4} - \frac{a^{4} + b^{4}}{ab(a-b)^{2}}v^{3} + \frac{2(a^{4} + b^{4})}{ab(a-b)^{2}}v^{3} - \frac{a^{4} + b^{4}}{ab(a-b)^{2}}v^{2} + 1 = 0$<br>$\therefore v^{3} - \frac{a^{4} + b^{4}}{ab(a-b)^{2}}v + \frac{2(a^{4} + b^{4})}{ab(a-b)^{2}} - \frac{a^{4} + b^{4}}{ab(a-b)^{2}} \cdot \frac{1}{v} + \frac{1}{v^{2}} = 0$  |  | • • • • • • • • • •  |       |
| $\therefore v^{5} - \frac{a^{4} + b^{4}}{ab(a-b)^{2}}v + \frac{2(a^{4} + b^{4})}{ab(a-b)^{2}} - \frac{a^{4} + b^{4}}{ab(a-b)^{2}} \cdot \frac{1}{v} + \frac{1}{v^{2}} = 0$  | ab(a - b)*v* -                                 | $(a^{4}+b^{4})v^{3}+2(a^{4}+b^{4})v^{2}-(a^{4}+b^{4})v+ab(a-b)^{2}=0$  |       |
|   | $\therefore v^4 - \frac{a^4 + b^4}{ab(a-b)}$   | $\frac{1}{a^2}v^3 + \frac{2}{ab}\frac{(a^4+b^4)}{(a-b)^2}v^3 - \frac{a^4+b^4}{ab(a-b)^2}v^{7+1} = 0$         |       |
|   | $\therefore v^3 - \frac{a^4 + b^4}{ab(a-b)^3}$ | $v + \frac{2(a^4 + b^4)}{ab(a - b)^2} - \frac{a^4 + b^4}{ab(a - b)^2} \cdot \frac{1}{v} + \frac{1}{v^2} = 0$ |       |
| $\therefore \left(v^{2}+2+\frac{1}{v^{2}}\right) - \frac{a^{4}+b^{4}}{ab(a-b)^{2}}\left(v+\frac{1}{v}\right) = 2 - \frac{2(a^{4}+b^{4})}{ab(a-b)^{2}}$  | $\therefore \left(v^2+2+\frac{1}{v^2}\right)$  | $-\frac{a^{4}+b^{4}}{ab(a-b)^{3}}\left(v+\frac{1}{v}\right) = 2 - \frac{2(a^{4}+b^{4})}{ab(a-b)^{3}}$        |       |

A quadratic from which the values of v can be easily found.

 $\therefore \left(v+\frac{1}{v}\right)^2 - \frac{a^4+b^4}{ab(a-b)^2}\left(v+\frac{1}{v}\right) = 2$ 

 $ab(a - b)^2$ 

NOTE. -- The paper may be found on page 770. Volume II., of the EDUCATIONAL WEEKLY. 1. Book-work. 2. The cloth must sell per yard for \$\$10,434 × 2 → 211 1/2 or \$4.59 114. 3 Sum (660+27+113s) pence, or £2 171. 4131d. 4. 110 bushels of wheat at 97 cents per bushel are worth \$106.70. The difference in the price, \$11.75, is caused by some of the wheat being 72 cents per bushel ; but the difference in price per bushel is 25 cents, hence the number of bushels at

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97 cents is 63. 5. 2 of number of yards = 96 \*.\* number of yards, is 240.

72 cents per bushel is \$11.75 ++ \$25 or 47, and at

6. Cost of insuring is (7/8 -1- 991/8) of \$47580 or \$120.

7. A's share  $\times \frac{1}{22} = B$ 's share,  $\times \frac{1}{24} = C$ 's share  $\times \frac{1}{3\pi}$ ;  $\therefore$  B's share = 11 of A's share, and C's share = 5 of A's share. Representing A's share by 1, B's share will be represented by 11. and C's share by 5. Divide \$4941 in the proportion of 1, 14, J. A gets \$1822.50, B \$1701, C \$1417.50.

8. Interest on \$100 for  $3_{15}$  months at 14 % per month is \$3%. Hence face of note is \$\$50 -- 961/100, or \$\$\$4,265.

9. If \$7.800 is derived from an investment of \$78000 (\$48000 + \$30000) per month, \$5800 is derived from \$58000 per month. But by the question, A had \$6000 invested for 5 months, which is equivalent to \$30000 for one month. Hence during the last seven months of the year A had invested a sum equal to \$28000 per month. The sum is plainly \$4000. A therefore withdrew \$2000.

to. (1) One brick of the second kind contains 8 times as many cubic inches as a brick of the first kind. Hence one brick of the second kind weighs 40 lbs.

(2) First find the height of the wall; (height)<sup>2</sup> + 10° = (length of ladder)2. Also, (height - 2)2 +  $14^2 = (\text{length of ladder})^2$ . .:  $(\text{height})^2 + 10^2$  $= 1 \operatorname{cight} - 2)^{2} + 14^{2}$ , whence height = 15 ft. Length of ladder =

 $\sqrt{(25^2 + 10^2)}$  or  $5 \sqrt{29}$  or 26 925 ft. A. M. BURCHILL.

A SAD story is told of the recent suicide of a young girl attending the high school at Attica, N.Y. Katie Schroader was her name, a pretty German girl only sixteen years of age, and life was ended by poison taken from her own hand. She was conscious for several hours before she died, but resolutely refused to give any explanation of the cause for the terrible act. It is generally believed, however, that an overtaxed brain coupled with annoyances at home, and possibly heredity insanity, account for the suicide. She had attended the school for several years, and was the youngest member of the class that will graduate at commencement in June.

MILES FERGUSON.

THURSDAY, JUNE 3, 1886.

#### THE DUTY ON BOOKS AND SCI-ENTIFIC APPARATUS.

By a telegraphic despatch from Ottawa, received on the day following the publication of the last number of the EDUCA-TIONAL WEEKLY (which, our readers will remember, contained an article advocating the exemption of books and scientific apparatus for the use of schools and colleges) we learn that the Government has abrogated its rule of the 31st of March last, and placed upon the free list all such philosophical apparatus intended for the use of schools and colleges as is not manufactured in Canada.

It was on this point that we laid more especial stress in our remarks upon this subject, and we are very pleased to see that the Government's view of the question thus far coincides with that expressed by ourselves.

Whether or not the conditions might have been ampler, and free competition allowed between home and foreign manufacturers of scientific apparatus, is a question which will be variously answered, according as one is a disciple of Cobden or Carey.

All interested in the maintenance of the high standard or our schools, however, whatever their views on free trade and protection, will be glad to see this more enlightened view of the matter being taken by the authorities.

#### LAME'S "ADVENTURES OF ULYSSES."

In this issue is commenced, under the heading of "Literature and Science," Charles Lamb's "Adventures of Ulysses."

For several reasons we think this an admirable work to place, not only before teachers, but also before pupils. And for many reasons. Some of these may be here stated, for by them our readers may receive suggestions as to the best means of utilizing these chapters in the schoolroom : The style, it need scarcely be said, is beautiful; it is also extremely simple, and, therefore, intelligible to very young children; the story is interesting to a degree, and deals with a classical subject which all our children, without exception, will in after life meet with in their general reading and conversation; the "Odyssey" in its

entirety is not likely (in this country) to be read except by a very small percentage of our pupils, and Lamb's Story, read in early life, will fix in the memory of its readers very many facts which are constantly alluded to in the literature of all European countries. From the story itself a large number of moral lessons may be learnt : Circe may be explained symbolically; so, too, the Lotos eaters; and the Sirens; and Calypso: from Ulysses' indomitable perseverance and Penelope's faithfulness, also, high ideals might be drawn-and all this with the knowledge that these were first sung by the first of poets. A knowledge of the geography of ancient Greece, too, may be acquired from these tales. Something also of the manners of mode of life in ancient days.

We might suggest that a part of each Friday afternoon would be well spent in the perusal of these tales from Homer.

#### OUK EXCHANGES.

Littell's Living Age for May 29th contains, amongst other articles, "Matthew Paris," from the Quarterly; "Mr. Foster," from the Fortnightly; "The Fame of Turner," from the National; "Abp. Trench," from Macmillan's; and "Tobacco-Growing in England," from the Times.

#### REVIEIVS AND NOTICES OF BOOKS.

Lamb's Adventures of Ulysses. Edited with notes for schools. Boston : Ginn & Company, publishers.

Having already taken notice of this work in the editorial columns, it is not necessary to say more than that it is excellently printed and most elegantly bound. A brief life of Homer and an account of his works are prefixed. The pronunciation of Greek words, and such other information as may be required for an intelligent appreciation of this prose poem, will be found in the foot notes.

Die Karavane. By Wilhelm Hauff-Notes and Vocubulary by Herman Hager.

It is not paying too high a compliment to German writers to say that they excel in fairy tales. A certain innocence, simplicity and even naivele pervades them that we miss in the fairy tales of other nations, including our own. "Die Karavane" is no exception, though we would not compare it with the tales of Grimmand Hans Christian Andersen. The story, or rather the succession of tales, told by the members of the Karavane, are related in simple German, interesting enough to attract and retain the attention of the reader, while the vocabulary and notes aid one in the study of the German language. The notes are very good, bringing out the force of idiomatic phrases fully, while the vocabulary is to be plaised for the choice of words which the editor makes in giving an English word for the German.

Selections from German Authors. By Dr. Buccheim. Boston : Ginn & Company.

Dr. Buccheim is well known to students of German from his selections of English to be rendered into German. Anything coming from his hand is sure to be worthy of attention. At a time when German literature is taking so foremost a place in English thought, a work that is designed to take English readers by easy steps through German authors cannot be amiss. Dr. Buccheim, we must say, has fulfilled his task with that completeness for which Germans are distinguished. We are a little inclined to quarrel with his continual references to M. G. R., which we find stands for his Modern German Reader. It is hardly fair to expect that every reader will have access to it. But the selections in the little volume are from the best authors-the notes copious without annihilating (as some notes do), necessity for research on the part of the student. One peculiarity of the work is the reformed orthography that the author adopts. Superfluous letters are in every case omitted, and the spelling throughout much simplified.

THE Scribners are about to publish a uniform edition of Mrs. Burnett's works.

GEN. MCCLELLAN'S Memoirs are to be published by Charles L. Webster & Co.

HELEN HAYS, a writer for the young, has just written a novel which Thomas Whittaker will publish this month.

SWINDURNE'S new volume of prose miscellanies will contain his cuticisin of many of England's eminent literary personages.

WALTER BESANT has written a new novel in which he deals with the problem of the poor. It is called "The Children of Gibcon."

THE indications are that an unusually large number of novels by American writers will be printed for the coming summer's consumption.

MRS. OLIPHANT is understood to be writing a life of the late Principal Tulloch, which will be published about the end of the present year.

PROF. BOYESEN lectured at Wells College recently on "French Poets and Critics." His predecessors as lecturers at Wells were Mr. Arnold and Mr. Gosse.

MR. W. M. ROSSETTI is engaged on an Introductory Note to a selection of the choicest specimens of Walt Whiyman. Chatto & Windus will publish the book.

FRANKLIN PIERCE ABBOTT is translating Tolstoï's "Sketches of Sebastopol." One, at least, of these three sketches has appeared in the *Revue des Deux Mondes*.

MR. TUPPER's autobiography, "My Life as an Author, by the writer of 'Proverbial Philosophy," has just appeared in London, and is said to be creditable to the author's tact and taste.

THE friends of the late Lionel Tennyson, the poet's son, expected great things of him in a literary way. His special study was the English drama and its relations to the dramatic poetry of the Orient. MR. JULIAN HAWTHORNE has become literary editor of the *World* and Mr. G. P. Lathrop of the *Star*; so we suppose the starting of a weekly magazine by these two gentlemen has been indefinitely postponed.

MARSHAL MACMAHON is preparing his memoirs with the purpose of explaining certain acts in his life which have been the cause of much unfriendly criticism. The book, however, will not be published until after his death.

MR. HENRY CLEWS, the banker, will soon publish a book entitled "Twenty-Eight Years' Experience in Wall Street." As few men have been able to have so protracted an experience, Mr. Clews is undoubtedly well-qualified to be the historian of the street.

MR. HOWELLS and Mr. Curtis will, in the forthcoming June number of *Harper's*, both write of Longfellow, the former of the poet's rightmindedness and lofty purpose, while Mr. Curtis will discuss his life as illustrating the character of his work.

UNDER the title, "The R. T. S Library," the Religious Tract Society are publishing a series of cheap words of biography, travel, fiction, etc. The first four volumes are the "Life of Oberlin," "Canadian Life and Scenery," "Adventures in New Guinea," and "Pilgrim-street."

THE King of the Belgians gives five thousand dollars every year for the best essay on some subject which he selects. This year the prize was taken by a French engineer who wrote on "The Best Means of Improving Sandy Coasts." The subject for next year is "The Progress of Electricity."

TRUBNER & Co. will issue shortly, in their "English and Foreign Philosophical Library," the second and third volumes of Schopenhauer's "The World as Will and Idea," translated by R. B. Haldane and John Kemp. These two volumes, which consist mainly of what Schopenhauer called "supplements" to the first volume, complete the work.

MESSRS. GEORGE ROUTLEDGE & SONS have in preparation a very elaborate and beautiful edition of Goldsmith's "The Vicar of Wakefield." The illustrations have been drawn by French artists, they will be printed in colours in France, and the sheets sent to England and this country, where the text will be printed. The American edition will be ready in August.

THE great success of Mr. Waiter Pater's book, "Marius the Epicurean," has apparently encouraged him to undertake another work somewhat in the same field of literature. His new volume will be a romance, the time of action being the sixteenth century. The scene is laid in France. The publishers will be Messrs. Macmillan & Company.

WE learn that by request Mr. J. Macdonald Oxley, of Ottawa, has written a paper on the "History of the Fisheries Question" for the Magazine of American History. It will appear at once. Mr. Oxley has a bright, interesting story, "The Professor's Last Skate," in the May Wide-Awake; and the same magazine has on hand another article of his on the "Birds and Beasts of Sable Island," which will be richly illustrated. MESSEC. APPLETON will soon begin an International Education Series. Two volumes are nearly ready for publication—" The Philosophy of Education," by Dr. J. K. F. Rosenkranz, of the University of Konigsberg, and "A History of Education," by Prof. F. V. N. Painter, of Roanoke College, Verginia. This series will embrace works by European as well as American authors, and will be edited and contributed to by Dr. W. T. Harris.

D. APPLETON & Co. will publish immediately, in the "International Scientific" series, a work on "Earthquakes and Other Movements," by John Milne, Professor of Mining and Geology in the Imperial College of Engineering, Tokio, Japan. "The First Earl of Shaftrsbury," the latest addition to the "English Worthies" series : "A Manual of Mechanics," an elementary text-book designed for students of applied mechanics, by T. M. Gordon.

A NEW (the fourth) edition of Judge Nathaniel Holmes's "Authorship of Shakspeare," has just been brought out by Houghton. Millin & Co., in two volumes. The lapse of more than a decade has failed to shake the author's belief in Bacon's title to the plays; and to his Appendix he now adds a supplement of 120 pages, for which Mrs. Henry Pott, by the publication of her "Promus," is chiefly responsible. He also furnishes a general index, so that in all respects the work is better of its kind than it was before.

D. C. HEATH & Co. will publish about June 1, a new and enlarged edition of "Common Minerals and Rocks," by W. O. Crosby, Assistant Professor of Mineralogy and Lithology, Mass. Institute of Technology. The edition is nearly eque, in amount to the original bee" and is on the subject of Petrology. It is illustrated by forty figures, which add very materially to the clearness and value of the text. This little volume is not merely a guide to teachers, but it is also a simple and logical presentation of the leading facts and principles of structural geology, and is well adapted for class use.

"FORGOTTEN MEANINGS" is the title of a little hand-book in which are called to mind the original meanings and use of many words whose early signification has been generally lost sight of. Thus, to give one or two illustrations, the word "awkward," is, by derivation, "left-handed"; the word "aghast" describes terror such as one feels who sees a ghost; the word "nincompoop" is, the editor tells us, a corruption of the phrase non compos mentis; and the word "bogus," he asserts, comes from "Borghese," a rascal who swindled many people in this country by counterfeit bills,—*Christian Union*.

MR. STANFORD will issue immediately, "Infant School Management, with Notes of Lessons on Objects, and on the Phenomena of Nature and Common Life," by Miss Sarah J. Hale, late teacher of method, St. Katherine's Training College, Tottenham, now at Newnham. The work is of a thoroughly practical character, and the sketches of lessons in "Natural History," "Natural Phenomena," "Food Plants and Others," and "Common Objects and Employments (chiefly connected with the dwelling)." are such as to interest and attract the pupil, while giving valuable hints and suggestions to the teacher. GINN & Co. will publish June 15 a new edition of "Six Weeks' Preparation for Reading Casar," adapted to Allen and Greenough's, Gildersleeve's, and Harkness' Latin Grammar, by Jamer M. Whiton; also, in their "Classics for Children," "The Peasant and the Prince," an excellent story of the French Revolution, by Harriet Martineau, edited with notes for schools. In July they will issue in the same series, "Gulliver's Travels," which will be followed by Scott's "Ivanhoe" and "Guy Mannering,"Johnson's"Rasselas," and "Plutarch's Lives." They have in preparation for the series Irving's "Alhambra," the "Arabian Nights," and "Irving's "Life of Washington."

T. Y. CROWELL & Co. will publish at once a work of importance on the labour question in America by Prof. Ely, of Johns Hopkins University, who is recognized as an authority on the subject. He has given to the preparation of this work much time and thought, and has no doubt produced a work of enduring value to all parties interested in this question. Messrs. Crowell have in preparation a work of fiction which touches this subject from a Russian point of view, entitled "A Vital Question, or, What is to be Done?" by Nikoliai Garrilovitch Tchernuishevsky, translated from the Russian by Nathan Haskell Dole. The author of this work, a noted Russian liberalist, was banished to Siberia for his liberalistic ideas, and his book has been forbidden in Russia. It is secretly circulated, however, and is immensely popular there as well as in Germany.

WILLIAM HENRY BURR, of Washington, has mailed us a page of a pamphlet entitled "Proof that Shakespeare Could not Write." Mr. Burr reproduces the five Shakespearean signatures affixed to legal documents, and calls them scrawls. Mr. Burr is a believer that Bacon wrote "Hamlet." "Othello," " Lear," etc., and is an admirer of the propaganda of Appleton Morgan and Ignatius Donnelly. In this matter of Shakespeare the philso-pher may see the disease which the greatest fame develops. It becomes certain that in the dim future, as Napoleon's history attains a wider reading, the parasites will also attact that, labouring night and day, with a greedy industry and a fanatic's grin, to prove that Bonaparte was impossible. The skit written on Napoleon as Apollon will serve as a better basis than any the demolishers of Shakespeare have yet discovered. Parents should start their children right on this monstrous attempt to disinherit the bard of Avon. Bacon was no more a poet than Emerson or Joseph Cook .-- The Current.

#### BOOKS RECEIVED.

- Annual Report of the Schools of New Brunswick. 1885. By 1° 2 Chief Superintendent of Education.
- The Adventures of Ulysses. By Charles Lamb. Edited, with Notes, for Schools. Boston : Ginn & Co. 1886. 109 pp. 30c.
- Habit and its imfortance in Education: An Essay in Pedagogical Psychology. Translated from the German of Dr. Paul Radestock by F. A. Caspari, with an introduction by G. Stanley Hall, Ph.D., Professer of Psychology and Pedagogy, Johns Hopkins University. Boston: D. C. Heath & Co., Publishers. 1886. 117 pp. 55c.

### Educational Opinion.

#### THE PUBLIC SCHOOLS AND NERVOUS CHILDREN.

"Relief for overworked brains, cause and cure. Dr. Blank's pills are valuable for school children, who suffer from nervous headaches caused by overworking the brain in study, and for all classes of hard brain workers, whose overtasked nervous centres need repair and sedation."

THE above paragraph is copied *verbatim* from an advertisement in a daily paper, published in an inland Western city, and it seems to me that, whatever may be the value of Dr. Blank's pills, the fact that it pays to advertise such medicines for children, and that the pupils of our public schools are classed with overtasked brain-workers, is somewhat startling.

No one will dispute Dr. Hammond's assertion that we are probably the most nervous people on the face of the earth. There are causes enough for it. The blood of all nations in Europe is mingled together here, subject to a climate peculiarly exciting to the nerves. The great prizes of life seem open to all; and when a man has climbed his highest, he exclaims, triumphantly, "My children shall have a better start than I had.' There is scarcely a white child born in this country that does not inherit some nerve-weakness from its over-eager parents ; and it must be admitted that some of our educational methods may increase and exaggerate this fatal tendency.

In the calm faces of the statues the Greek sculptors cut, twenty-five hundred years ago, is reflected the ideal of that people. A Greek might philosophize upon this life, and strive to peer into the world beyond the grave; and he might cherish uncomfortable personal ambitions; but his ideal man was always, first of all, a splendid animal. Fine physical training was an essential part of every child's education, and to possess a good chest and harmoniously-developed muscles was quite as necessary as to be clever at argument. To-day, as M. Taine somewhat grandiloquently observes in his Philosophie de l'Art en Grèce, " Man is a prodigicus brain, an infinite soul, for which its members are only appendices and its senses only servants." The average man of the century is of Sydney Smith's opinion, and thinks "the body of an athlete is of little use, since, for a few shillings, one can hire a pistol, a post-chaise, or a porter."

There is, however, a happy mean between giving all one's attention to physical culture, or to mental discipline, and some of our colleges and universities attempt to reach this mean by encouraging manly sports. But the rank and file of the men of this country do not go to college, and there is absolutely nothing done for them, physically,

just at the time it would be most valuable; namely, in childhood. No text-book for common schools exists on that most vital need, the wise care of the body ; and physiology is rarely taught so that pupils listen, eager and attentive as I once saw a class of boys and girls listen to an accomplished woman who, by means of a manikin, taught them the secrets of man's house of life. Not one school-boy in a hundred knows anything about the functions of his skin, and the proper care of his nose, ears, and eyes. The fortunate ones whose appetites and love of mischief keep them from overapplication to their books, are as awkward as calves, and use their fresh, young strength with neither grace nor skill.

But in childhood the body is as sensitive as the brain, to all impressions. Any habit or mode of exertion begun then is, so to speak, built into the intimate substance of the organ or organs exercised. Nature is then busy laying foundations for the individual life, and its perpetuation in new beings; and, in her building, stores up mental and physical health, or weakness and disease. Many of the nervous disorders of adult life, which physicians diagnose as "reflex irritation," can be traced to defective care of the body during childhood; and there is no doubt that the more grave neuroses, chorez, and epilepsy, and the craving for alcohol, could be traced to the same remote cause. In childhood, or never, the organic condition of the nerve-centres is brought to a perfect tone; and a child, neglected in body, may not only acquire a tendency to a particular form of disease, but he may transmit such acquired tendencies, in adult life, to his children.

For two \_ :ars I had an opportunity to observe a little girl, daily, who was just beginning to attend school. She was of a nervous temperament, but had a singularly sweet and patient disposition. The school, a small-private one-was held in a mediumsized parlour, and the scholars were permitted unusual freedom. But, after a few weeks of school, my little friend would come home with a bright red spot on each check and two sharp little lines between her eyebrows, and there was an irritable note in her voice as soon as she was crossed. A few weeks more, she would lose her appetite and begin to grow thin, when her patents would take her out of school. To see her freshen up was like watching a drooping flower during a rain. Her nervousness disappeared, and she was entirely happy save for the fact that she was out of school. About the same period I observed another little girl of eleven, who was attending the public school, and saw the same phenomena, only in her case severe nervous headache set in. The studies pursued by these two children were easy for them, for they were very bright and

quick, and learned long lessons at home without injury. Bad air, enforced stillness, prolonged efforts of attention, high schoolbenches, and emulation, were the causes which affected their health.

That the average public school-house under the average school board, is not a perfect success, anyone will discover who will stand before one when the children are rushing out at recess or at the close of a session. Even when the children are noticeably clean, the odor is intensely disagreeable. Ten to one this average school-house is ventilated by opening the windows, a method which has the peculiar advantage in winter of giving at least half the pupils a chance to catch cold. The rooms are heated by stoves, generally placed at one side of the room, and the benches or chairs are made on contract by a man who has only the vaguest notions about the human spine and the legs of a growing child. The windows are set in where the architect thinks they will look well-an arrangement which often causes startling results in the school-rooms.

In the seminary in which I spent my school days, the girls' study-room, which was also used as a recitation room, faced the north and west. We sat looking toward the four long west windows, and the light from the line of windows on the north side shone over our right shoulders. The desks were handsome, but they were too low; and, as at any sacrifice of comfort we must be ladylike, we usually put our elbows on the desks and studied with raised shoulders and bent heads, a position which in my own case exaggerated a congenital short-sightedness. That the average school-house of to-day is not an improvement upon that seminary, I found out a year ago when visiting a new one. It was a handsome pile of creamcoloured stone; but the study-room, which was also the largest and most-used recitation-room, faced the south, and every pupil in it had to sit facing the four large windows by which it was lighted. The registers were all placed on one side of the rooms, and, if possible, in front of the doors, "in order that opening and closing them might diffuse the heat "-so the chairman of the trustees told me, explaining that he claimed the honour of their arrangement. The only possible way to ventilate the rooms was by raising the windows. During the severe winter weather the furnace heat was insufficient, and stoves had to be put up in the larger rooms. The district was poor. The schoolhouse had cost a round sum of money, and the chairman, whom I have mentioned. desiring an office more lucrative than the one he held, conceived the idea that he could win popularity by saving money to the tax-payers. So he ordered the janitors not to build the fires till half-past eight in the morning, and then to fill the stoves full of coal and lay the kindlings on top. In spite of sneezing children and protesting teachers, he persisted in this nonsense for a week, when he was fortunately laid up with rheumatism.

At another school, the teachers, afraid to raise the windows at any other time, raised them at once and kept them open during the twenty minutes of recess. A frugal trustee, seeing them fly up in zero weather, forbade their being opened. "It is using up the school fund for coal at a perfectly awful rate," said he; and then, to economize still more, he succeeded in doing away with recess altogether, because it squandered twenty minutes, during which time the teachers were paid to work.

The system of marks and rewards introduced into some schools is pernicious in the extreme, inits effects upon sensitive children. I overtook a little friend, a lad about nine years old, who, pale and trembling, was going slowly home.

"What's the matter, Tom ?" I asked.

"Headache," he said briefly, his white lips giving emphasis to his answer. A second later he darted to the other side of me, and seemed anxious to avoid being seen by a boy on the opposite side of the street. He explained that in his class-room the pupils were set in divisions, and that if every member of a division was present and stood perfect for a month that division had a holiday. "That boy belongs to my division," he said, his face twitching and his body swaying, for he was too ill to walk straight. "The boys'll light on me, I tell you, for we were all perfect, and our month is up to-morrow."

The marking system, like the old hickory ruler, may be useful in some cases, but for the bright, nervous, American child it can easily become a torture, to be excused only by that most pitiful of apologies-it is wellmeant. I knew a girl who had grown remarkably from her tenth to her twelfth year, but whose nervous system had not kept pace with the general development of her body, who was thrown into hysterio-epileptoid spasms, by receiving ten demerits for failing in a recitation she had studied hard to excel in. An attack of chorea followed; and, though six years have passed, during which time she has been under medical treatment and led a simple, out-of-door life, she is not yet recovered from that nerve-shock and its effects upon her mind and body.

Exhibitions and public examinations of children under sixteen years of age are to be deprecated, for the same reason. Not only do they excite the pupils and use up nervous energy needed for their studies, but they seriously interfere with the genuine school work, and tend to teach that most pernicious folly—that knowledge is something to make a show of.

The hurry characteristic of the age is rampant in the public school. "I'm dreadful glad I don't go to the school you did," said a little miss of fifteen to me, not long since. "I wouldn't be seen going to school till I'm twenty. They ain't a girl in our class who'll be sixteen when we graduate next year." Now, this little miss cannot do a sum in percentage without help. Her grammar is faulty, and from the "ologies," through which she has sped in a sort of rapid transit, she has gathered almost nothing. And when, not long since, she was appointed to write a short essay on the literature of the age of Elizabeth, she was helpless, and her cousin wrote a paper for her. Yet this girl had worked hard, and was accounted a diligent student.

The gravest difficulty in the way of improving the régime in the average public school is the mistaken ideas entertained of education. To a man who thinks it is something to be acquired or possessed, there is nothing absurd in storing a child's mind with a multitude of facts which he has no conception of, and which will ever remain mere words to him, and which will be of about the same benefit to his mind as a dinner of corks would be to his body. To possess an accumulation of facts is, under given circumstances, a good thing ; but as the growth of the body and the increase of its capabilities are dependent upon the assimilation of the food it feeds upon, so the understanding broadens and grows strong in assimilating, not accumulating, knowledge.

In this country, the public will always believe with Macaulay, "that the one who has the right to hang, has the right to educate." But if the people have a right to educate all the children, they have no right to depute the work to politicians. The men and women who make teaching a life work, nay-the elect among them, ought to be at the head of the management of all our public schools. Showy school-buildings, whose towers can be seen afar off and whose chief praise is in being ornaments to the city, would then give place to buildings best adapted to school work. Human lungs, spines, and eyes would be taken into account, and the school-house, like a perfect home, would grow from within outward.

Moreover, the kindergarten ought not to be the luxury of the well-to-do, but the blessed privilege of every little child. The power of attention in children, as in animals, that are seems to be purely automatic, and is determined solely by the attractiveness of the object to which it is given. Following the children. leadings of nature, the kindergarten methods beguile a childintolearning, and do not at first ask of him sustained attention—an act which fatigues his nervous system exactly as prolonged exercise fatigues his muscles. These nature-methods also strengthen the power Journal.

of self-control, and incite in the child selfdirection.

Human beings, like plants, need an atmosphere: and I doubt if the best methods of teaching will ever bear their finest fruit in large schools. Small hospitals are the best; and it is an open question whether lunatics should be herded together. No comparison is possible between our public schools and a college or university, for in the former there is no solitude or privacy possible to the pupils during school hours. Yet, to a child under fifteen years of age, the need of motion and f :sh air is more vital than it will be to him when he shall pass that age. Mary Putnam Jacobi says, gravely: "The confinement of school-hours for children under nine years of age is a circumstance of serious moment in the hygienic history of women." It seems to me this observation applies, in a degree, to men. Small schools, in rooms properly ventilated, warmed, and lighted, with movable desks and seats, so that the tall children and the short ones may be as comfortable as the middle-sized, are the ideal schools. A big play-ground should always surround the school-house, and wide verandahs, suitably furnished, would permit recitation in the open air at times, in summer. For severe winter weather, a warm play-room for the more delicate children to romp in should be provided. Of course all these things will cost money. But the children are heirs-not only of their parents, but the nation; and our duty toward them is in exact ratio to our knowledge and wealth .- Education.

IT is always an injury to the minds of children to attempt to make them express thoughts they do not have. If a pupil has a subject concerning which he knows little, and about which he is required to write, he usually becomes disgusted, and concludes that "writing compositions" is a humbug; and to him, under those circumstances, it is, It is also a great injury to a pupil to make him read what is too deep for him. A young girl recently brought home to her mother an extract from Keats, that she was to read. Looking at it, her mother said : "Why, I cannot make head or tail of that myself !" Comprehension and adaptation are two golden words for the teachers' vocabulary; there can be no interest without both. Those authors who can be understood are the ones that are read. None others should be. Cheerful sunshine, beautiful flowers, happy voices, and good stories are the delight of children. There is only one thing a child likes better than an excellent story or a beautiful book ; it is the opportunity to read the book or tell the story to some one else. Communication is his delight whenever he has a good listener .- New York School

## Methods and Illustrations

#### WHAT MAY A TEACHER DO AND BE IN HER SCHOOL-ROOM RELATIONS?

FIRST of all, she may be sunshiny. There is nothing so warming, so inspiring to both child and adult as a magnetic, cheerful presence. "She is so pleasant !" is the universal verdict of the pupils in a certain school. There are few difficulties that may not be righted by the aid of some of this soul sunshine. The little children look to you as their central sun. Let your love and interest speak from your eyes and beam from your face. How quickly the brightness is reflected in the little faces before you.

A visitor once entered a schoolroom. It was a cold, gray day, with no trace of sunbeam; yet the whole room seemed flooded with light. There were dozens of happy little faces,-there was one earnest, happy face to which all turned. As the teacher went up and down the aisles, more than one small hand caressed her gown. As she bent over one and another slate more than one little arm hugged her tightly. At recess the the children hung about her as flies seek the honey-jar. "Well," thought the visitor, "I can see why my Jamie adores his teacher. She is a regular mine of sunshine. Last year he came home nervous and tired ; this year it is not so."

Fellow-teachers, do we properly estimate the value of this quality? The children under our care are like so many sensitive plants. They vibrate to the slightest touch. Oh, the magic of a smile! How it chases away sullenness and discontent. There are so many schoolroom breezes that can be dissipated by a good, hearty laugh.

Confinement under the happiest circumstances is wearing. When we think of a little child sitting for hours in the schoolroom, refraining from talk or play, and sticking resolutely to work, does that not presuppose a wonderful amount of self-control on the part of the little one? If, in addition, the pupil is subjected to harsh words, fault-finding, orders given in irritable and screaming tones, will the child go home, calm, happy, clevated ?

Our work is wearing to both mind and body, but the more thoroughly we are under control ourselves, the less friction there will be for all. Happiness is the great apostle of cheer and light to the human soul. Cultivate in yourselves the happy spirit, and you find new beauties even in the commonest things, and may lead others to see them.

Besides being sunshiny, a teacher may be composed. There is nothing so utterly fatal to good discipline as the teacher whose wits go wool-gathering without the least warning. Keep cool, and don't be easily flustered. Suppose things do worry and fret, keep the tight reign on them or you will be tormented a thousand-fold. If you are unsuccessful; make up your mind that it is probably your own fault. Don't scold, for you not only impose a martyrdom upon helpless children, but thereby give way to a weakness for which you may well blame yourself when the time for reflection comes. We do not mean to fall into these errors, but we drift "nconsciously into the worst of them. Let any one who thinks herself exempt listen a while to her own children as they play "school." Her vanity will be rudely shaken in less than five minutes.

There is also a composure in actual teaching which is absolutely necessary if children are to think carefully and accurately. No one desires wandering attention or flagging interest, but the closest attention. The most eager interest may be preserved where the teacher is calm, cool, holding the childien to the point, and giving them the opportunity for deliberate, searching thought.

There is too much of the excited, spreadeagle, slap-dash quality in our modern primary schools The teacher may be calm and still, quick in her movements, enthusiastic, yet composed. She should learn to move about her schoolroom with as little noise as possible, and insist upon it that her pupils learn to handle themselves and their school-material quietly. No one can think in a racket. "My teacher talks so much I can't study," is a common complaint with children, and with good reason. This perfect control presupposes a like control of self on the part of the teacher, and a most orderly and systematic planning of school arrangements. Have everything ready. Do not trust to inspiration. A teacher may have tact in all her dealings with children. Study different dispositions, and realize that what may do for Susan Smith will not necessarily fit Bobby Jones' case. A little raillery for one-the gentlest tip of sarcasm for another; 2 plain-spoken word here-a tender, loving word there! Laugh off this storm, ignore some things, promptly quench others. Above all, treat your pupils as if you confidently expected their fullest sympathy and help; you will be far more likely to receive it.

Every teacher has it in her power to be a real, active, moulding influence in childish lives. You may lead young lives to be sweet and good, and that is far better than any mere intellectual attainment. For this round carth is not held up by spiendid achievements in any department of art, science, or letters, so much as by the common, everyday actions of love, unselfishness, and devotion. It is the home-like virtues which, after all, make life worth the living to even the most ambitious of us.—Am. Teacher.

#### HOW TO TEACH SPELLING.

ONE of the first difficulties that we meet is the apparent utter inability of certain pupils to master what to a teacher seems an easy and short lesson. Among the many reasons assigned for this, such as indolence, don'tcare-a-fig-ness, incapacity of memory, etc., on the part of the pupil, there is one on the part of the teacher which I have never heard mentioned, and that is, telling a child to study without first explaining what is meant by the term. This error, if already committed, should at least be corrected in the first school year, but an effective "Ounce of prevention" lies in "Putting yourself in his place," in a strictly literal sense, whenever a memory lesson is given, by the teacher carefully repeating each letter of a word in the child's hearing over and over again, and in this manner leaving no doubt as to what was meant by her command. I have quite often found pupils in the second grade who had not the slightest idea how to memorize, and have many times been surprised as well as delighted at the sudden and happy change from the discouraged, sullen or despairing mood of a pupil to a lively, earnest and studious one, as a result of just this little word : " Charlie, do you know how to fight Speiling? Le. me show you." The fact that you are willing to illustrate by doing proves at once your sympathy and desire to he'p, and directs attention not only to a mutual struggle, but directly to the mastery you are so anxious should be won. The wonderful power of sympathetic influence upon child-life can hardly be realized and certainly not over-estimated, and the distance from the first look at a new spelling lesson to its final attainment is often found to be simply the duplicate of that between the rostrum and the pupil's seat, which will happily disappear if the teacher will leave her "Chair of State" and put into practice the spirit of all true royalty expressed in this fitting school room motto, " Ich diene."

Quite a successful way of studying a spelling lesson is this: At a given signal all the pupils take their books, sit erect, with their eyes fastened on the page containing the lesson for the coming recitation. One pupil pronounces the first word, and this is followed by an interval of silent study, after which another word is given, and then another, until all the words have received this thoughtful attention. If the punils are accustomed to strict obedience, there will be no question as to whether their study is emphatically such or not, and this can be positively determined not only by the next oral or written lesson, but by your personal knowledge of each pupil, and your "inner consciousness;" you can feel it. The pupils soon learn also by their own estimate of the good results, both to appreciate and become interested in it, while at the same time a good opportunity is given for defining and talking about the new and difficult works of the lesson, as all thought, attention and interest are centred upon this subject, and other studies for the time being, are entirely laid aside.

Another successful plan, and one especially pleasing to the little people, is the frequent use of illustration. For the first grade the capital letters may be the grandparents, the small letters children, the double letters twins, etc. Finding words within a word is quite interesting, and in one so continually misspelled as piece, it will help the children very much to say: " Piece of what? Pie. Remember pie is in piece and then you will have no more trouble with it ;" the word many contains man, the funny thought that one man is found in a word meaning more than one, fixes it in the child's mind, and so this also is easily learned. Island-an island is land; together -I am going .o-get-her, and then we shall be together ; tomatoes - to and ma and toes; cupboard - we put cups on a board in the cupboard; breakfastbreak your fast ; gingham -g-ing-ham ; Stephen - step-ham ; atom - a-Tom ; animalcule-" Do you see this this small animal under the microscope ? Put the animal in the word and c-u-l-c. Then in words containing the letter i, ask "Who is in this word?" and the answer comes quickly, I so i is in raising twice; and treat the letter uin the same manner, as the word guide-you and I will guide others. The half hour for "Written spelling " in my grade is usually by this method made a very merry one, for as I take my chair down near the front row of desks there is an impatience quite manifest on the part of the pupils to begin the lesson and tell all they can about the words, and any amount of fun is sometimes created, when I am found in saucy, rude, truant, trout, squash, squabble, caucus, fuss, pauper and even in a saucer ! The word forty occasioned much merriment recently in a certain schoolroom where this plan was being tried, which serves as a funny warning to avoid extremes in this as well as other directions. After repeatedly hearing it spelled fourty, the teacher in rather a petulant tone said, " Please do not rut me in this word ; I am not forty." Quickly, in a clear tone, came this startling reply from a bright little girl, "Why no, Miss B., certainly not, you are fifty, aren't you?"

In the word hear, meaning to hear a sound, if they are taught to always remember that the name of the organ of hearing is contained in the word, they will nevermore confuse it with h-e-r-e.

A very good way to keep up the interest of naturally good spellers, and increase that of the unfortunate poor ones is the giving of cards. My pupils have a written spelling

lesson every day, and if they are one hundred, five successive days they are entitled to a card; a mark is placed at the fifth perfect lesson, and then they start anew. This happily does not confine the good things to the smartest pupil, as prizes so often do, but allows every one an equal chance, while it stimulates and encourages the dullest pupil to application and effort. And so in a certain schoolroom can be found, very often at eight o'clock in the morning, a half dozen pupils hearing as many others spell, in order to be quite positive that the lesson is well learned for that day. If scholars are thus one and all heartily interested, they will not only study hard during the school session, but will induce their parents or other relatives at home to help them at night.

Another quite essential, if not the greatest motive power in this study, is *fuss*; and as *you* are in *fuss*, and realize its value in other matters, so let there be no "Thus endeth" to the chapter of agitation, nor a pause in its spirit of enthusiasm, but from the first hearty "good morning" to the last pleassant" good night " let your firstly, secondly and finally be spelling.—*EducationalGazette*.

#### CHATS ON WAYS AND MEANS OF TEACHING.

HAVING no piano in my room, and wishing to have the physical exercises interesting as well as beneficial, I encouraged the children to bring two bean bags apiece. Most of the children are now supplied with them, and I wonder how I ever did without them. The exercises are spirited and varied, and as the children are growing rapidly, and there is some danger of their becoming round-shouldered, part of our daily exercise is to march about the room with the bean bags upon the heads. The children enjoy this part of the bean-bag game exceedingly, and take pride in searching their seats without having dropped the bean-bags

As the work in number progresses, make the questions as practical as possible. Have constant and daily repetition of the work, and present it with as varied exercises as possible. We must bear in mind that "little by little" will at last accomplish a great deal. I have tried the plan of having five or ten minutes' concert exercises regularly at the beginning of each session.

Last year, believing that if the child once knows the powers of the letters of the English alphabet, he has the key to unlock most of the difficulties of the language as they appear in print, I was in the habit of having the class give me the simple sounds daily during the first five minutes of the morning session. Sometimes the class gave the sounds, as I pointed to the different letters of the alphabet. Sometimes I called the letters by name, the children giving the appropriate sound.

As the result, the children had the power later in the term, to find out words for them, selves, and if a word were miscalled I had but to say, for example, "The a is long," to have the mistake corrected.

In the same manner I began, last February, to give the children short board reading lessons, not exceeding five minutes in length. As the children had become quite fluent readers, I began to use the "Monroe Advanced First Reader" for this purpose. The interest of the children was very great over these stories that were given to them in a serial form, so to speak, for the stories were too long to be finished in one or two lessons. I put these extracts upon the board before school, and many of the children would immediately turn and look at the board as they entered the room, to see what the new work might be, "Little by little," each day, the children put into script the lessons from the Primer. I set myself no limit, but taking a little each day, the class finished copying these stories by June. At first I set a copy as a guide to the children, but they soon became independent.

If one studies a foreign language he will find it a matter of some difficulty to repeat a sentence correctly after any one, though he may understand the sentence thoroughly.

Thinking some such work in their own tongue might be useful to the class, I have taken five minutes each afternoon, reading stories (Second Reader grade) to the class, requiring the children to repeat after me each sentence as it was read. Lately I have called on individual children to do the same work. The children have had read to them, and have thus repeated to me, the contents of two Second Readers.

When a new expression occurs, the children volunteer an explanation. The expression, "starred with dandelions," came up the other day, and was clearly explained by several of the children. Aside from the fluency the children have gained in repeating sentences, they have d-rived a great deal of instruction from many of the stories, and secured quite a large number of new words and expressions, which differ according to the vocabularies of the various authors.—American Teacher.

THE teacher who has never made a formal study of "Methods," but has the art of making the most of everything she knows by way of good teaching, developing her methods of work out of the work itself, will make a better teacher than one who knows the best things in the books without the skill to harness them to school life. The height of virtue in teaching is to know what is wanted by a close study of school-room work, and where to go for the best possible advice and counsel, principles and aids in doing that work. Books and work must go hand in hand.—American Teacher.

# Educational Intelligence.

#### ARBOUR DAY IN NOVA SCOTIA.

THE Grange Arbour Day (Tuesday, 18th ult.) was observed at Woodville section. Wellington Grange, located in this section, entered with much enthusiasm into the project—recognizing fully the practical as well as the aesthetic bearing of the observance, and appointed a committee to make all necessary arrangements. The trustees of the section, who are all members of the Grange, were of course in full sympathy with the project.

At the usual hour the scholars assembled at the school grounds in holiday attire, bringing trees and bushes, and evergreen for decorating the school house. Apparently most of the parents had left their work and come too. How many trees were planted, the writer of this notice cannot say, but as every scholar had a tree besides several memorial trees for the present and past teachers and a hedge of evergreen to the north, there must have been a goodly number. Merry games also were indulged in and the scene was one that might well make the heart of a zealous advocate of and worker for Arbour Day rejoice and feel abundantly repaid. By the time the trees were all planted, the afternoon was well advanced, but all cheerfully responded to the school-bell and took seats in the handsomely evergreen-decked schoolhouse. A chairman was duly elected, a programme was placed in his hands, and speeches, recitations and readings, interspersed with music, all more or less appropriate to the occasion, were given.-Halifax Critic.

#### SCHOOL POPULATION IN THE UNITED STATES.

IT appears from the last report of the Commissioner of Education, that the school population is, for 38 States, 16,510,463; for ten Territories, 283,939—cr a total of 16,794,402. Enrolment in public schools, 38 States, 10,572,751; 10 Territories, 165,441, or a total enrolment of 10,738,-192. Daily average attendance, 38 States, 6,590,-382; 9 Territories, 103,346—or a total daily average attendance of 6,693,918.

If to the enrolment of public schools be added that of private schools, as reported for 23 States and 2 Territories, viz.: 606,517, it will be seen that 11,344,709 youth, or 67 per cent. of the school population, have been bronght under instruction during the year.

It should be observed that school population bears to total population a ratio varying in the different States and Territories by reason of the variations in the legal school age. Eighteen different school ages are reported—the longest being from 4 years of age to 21, the shortest from S to 16. The school population is 16,794,402, and that the total daily average attendance is only 6,693,92S.—American Journal of Education.

#### POPULAR EDUCATION IN SAXONY.

THE leading position which Saxony holds among the educating countries of the world gives peculiar interest to her educational statistics. According to the census of ISSo, the population of the kingdom was 2,972,905. Recent reports give the

number of primary schools as 2, 147, attended by 472,000 pupils, taught by 5,654 masters and 143 mistresses. The schools are mixed as to sex ; and the law fixes the maximum number of pupils in a class at sixty, and the maximum number that can be entrusted to one teacher at 120. The rule is for these to be divided into two sections, each attending school three hours a day. School attendance is compulsory for all children from six to fourteen years of age. Boys are further obliged to attend during three years-i.e., between the ages of fourteen and seventeen-adult classes for two hours a week; the local committee may extend the time to six hours a week. The minimum salary of a licentiate teacher is \$130.25 with lodging and fire; of a titular teacher, \$202.65 in the smaller communes. In towns of more than 10,-000 inhabitants, the minimum salary of a head master is \$651.371/2. In the six chief cities of Saxony the salaries of head masters range from \$\$68.50 to \$1,230.371/2. The elementary school belongs chiefly to the commune, upon which devolves the burden of its maintenance. The sources of income are : school fees-which are very variable; special imposts, paid half by the proprietor of the soil, half by all the inhabitants of the commune above fourteen years of age; a permanent school fund. The total annual expense for primary schools, excluding normal schools, is about \$3,500,000, which gives an average of \$7.34 per child.-Education.

#### HINTS FOR A SUMMER HOLIDAY TRIP.

THE following letter, which was addressed to the Schoolmaster, London, Eng., is not only interesting in itself, but contains suggestions on a method of making the best use of holidays which teachers in Canada might make use of during the summer vacation:--

SIR,—A few years ago I arranged with Messrs. Langlands & Sons, of Liverpool and Glasgow, to send their magnificent steamship, the *Princess Royal*, on a trip round Scotland and back in Whitweek. I asked, through your columns, for a number of teachers to join me, and the result was we made up a party of more than 120, among whom were twenty ladies. The trip was a great success, everyone on board declaring that they had never had such an enjoyable trip before.

As Whit-week is this year very late, and the days at their longest, I thought it would be a good time to arrange for another trip, and thus affora some of my fellow teachers an opportunity of seeing, at a moderate rate, some of the most delightful scenery in the world. Messrs. Langlands & Sons have arranged to send the same magnificent vessel through the Western Highlands, to Shetland, Aberdeen, and Dundee, and back to Gairloch, Oban, and other places of interest if time permits. To visit these delightful spots by the usual routes would cost a considerable sum of money, and be practically out of the reach of many teachers ; but this affords an opportunity of enjoying fresh air and grand scenery at a moderate cost.

For those who wish to see Balmoral, I shall be able to arrange a marvellously cheap trip, in first-

class carriages, to Ballater, and coaches to Bræmar.

The vessel will leave Liverpool on the evening of Friday, 11th of June, at nine or ten o'clock, and return to Liverpool on Sunday afternoon, the 20th of June, so that the passengers can catch the trains for the south and be at work on Monday, the 21st.

A trip like this gives those teachers, who have worked themselves down and are not very well, a good chance to restore their health by a pleasant voyage. Two teachers have alreedy written me, saying that their doctor advises them to take advantage of such a trip.

The number is to be limited to 110, so that everyone can have a berth, and at meals there will only be two relays. At the last trip tl cre were 135 on board, and this necessitated diving in three relays, which was the only unpleasant circumstance connected with the whole voyage.

As there will be a piano on hoard, and we shall have concerts and dancing in the evenings, I shall be glad if those who propose to join and can sing, will bring their music with them.

The fare will be  $\pounds 3$ , and the meals 2s. for breakfast, 2e fid. for dinner, and 2s for tea. I may say that the food is good, and it is only those with very good appetites that can eat three such meals.

The maximum cost for the nine days, including food, will be  $\mathcal{L}6$ , and many will find that five pounds will cover their expenses from Liverpool to Liverpool.

As we shall allocate the berths in order of application, those who wish to secure the best must make early application either to me or direct to Messrs. Langlands & Sons, 5 Rumford-place, Liverpoo<sup>1</sup>.

I have omitted to say that time will be given at the various places of interest for the passengers to iand, and see some of the inland beauties within easy reach.

The captain is one of the kindest and most skilful on the coast, and will, I feel sure, do his best to make us all comfortable. Let me impress upon all those who think of joining to write at once.

Onto's public schools cost \$10,093,931 last year.

THREE million pupils now attend the free schools in the southern states.

TUTONS of Harvard receive salaries of from \$800 to \$1,200 a year, while the trainer in athletics gets \$2,000 a year.

THE Blair Educational Bill has been reported upon adversely by the House Committee of Labour, to whom it was referred.

**PROF.** MAX MÜLLER has accepted the presidency of the English Goethe Society, and preparations are making for quite a celebration when he delivers his inaugural address. Several of the German choral societies have promised their co-operation.

"THE Vienna correspondent of the *Times* reports that Dr. Gautsch, the new Minister of Public Instruction in Austria, has prohibited the use of ruled paper in square or diagonal lines, within all public schools. The reason for this is, that such paper has been found to injure the cycsight of pupils. It has been largely used hitherto in primary schools to facilitate writing and arithmetic lessons : but in future only paper plain or ruled in straight lines is to be used."-Nature.

SEVMOUR EATON, A.M., editor of Home and School Supplement, Toronto, Canada, will be associated with the Niagara Falls Summer School of Methods.

THE Teachers' Committee of the Board of Edu cation, New York, has agreed to make the maximum salaries of all principals who have been employed for lour years \$3,000. Nineteen principals will hereafter receive this salary.

THE Parkdale Public School Board met last week, when it was recommended by the Committee on School Management that a teacher be engaged exclusively for a kindergarten class, also an assistant to Miss Duff, who now has a class of nearly one hundred pupils. It was shown by Principal Wismer's report that the average attendance last month amounted to six hundred. The public examinations will take place on June 30th, and the annual games on July 3rd. An art class will also be established during the holidays. Twenty members have been already enrolled. It will probably be conducted by Mr. Hicks.

THE Silver-street Kindergarten Society of San Francisco reports three kindergartens with a total enrolment of 220, and a "housekeeper's class" with an enrolment of thirty girls from nine to fourteen years old. The society is now incorporated, and has planted a permanent fund looking to the abrogation of exclusive reliance in begging. The expenditures for the year were \$2,728.24, the cash on hand \$2,251.80. The leader of the society, Mrs. Wiggin, graces the annual report with one of her sprightly and vivid accounts that have brought her so much deserved success and sympathy.

# Correspondence.

#### TEACHERS' SALARIES. To the Editor of the EDUCATIONAL WEEKLY.

DEAR SIR,-In reference to the low salaries and lack of permanency in the teaching profession, I think teachers have no just cause of complaint. The popular estimate of a teacher's worth is invariably correct; and the teacher who complains of adverse criticisms and unjust or unfair usage is invariably an inferior one. Indeed I think Ontario treats her public servants with too much liberality in way of remuneration-teachers included. He is a poor teacher who cannot secure the privilege of fixing a salary commensurate with his services ; and keep a position as long as it is to his advantage to do so. More hard work and less complaining should be the rule with teachers. Some we fear have made teaching "a couch on which to rest and a costume in which to promenade," instead of carning their salaries honestly by hard work. I have been a teacher for many years, and I am more than satisfied with the salary I was paid and the treatment I received at the hands of the public; indeed both were much better than I deserved; and I will just add that I have never seen a bad boy or girl in school. Yours etc. J. ROBB.

Washburn, May, 1886.

#### TEACHERS' SALARIES.

To the Editor of the EDUCATIONAL WERKLY.

SIR,-In your issue of May 13th, you touch on a question of vital importance, viz., teachers' salaries. Why are teachers not more liberally paid? In my opinion it is because their efforts are not sufficiently appreciated. The trustees on whom they must rely for their remuneration are in many cases totally unfit to judge a teacher's work ; consequently unfit to say what salary he shall receive. To keep down the salaries seems to be the chief duty of the average trustee. Under our present trustee system teachers may look for fair play (and fair pay) but will look in vain.

Another reason our salaries are so low is the pernicious practice of making the teaching profession a stepping-stone to "something higher." This could easily be remedied by raising the standard of qualification, and by making each teacher serve his apprenticeship under the supervision of the principal; of course this arrangement would not suit those who would wish to teach only a few years and then go at "something higher," but it would be beneficial to the teaching profession.

> Yours, etc., PEDAGOGUE.

#### TEACHERS' SALARIES. To the Editor of the EDUCATIONAL WEEKLY.

DEAR SIR,-The school law has always been looked upon as so flexible that it may be obeyed or disobeyed at convenience. But there is one clause in the Act which the teachers at least and especially those teachers who have the good of the profession really at heart, cannot afford to have on the Statute Book without its being enforced-I refer to that clause which provides that teachers' salaries must be paid quarterly.

This law ought either to be strictly enforced or else repealed. For if not enforced it will only aid in doing what is being done in other ways-in driving the best teachers out of the profession. Teachers, having a patriotism for their profession, will, upon principle, when engaging, insist upon having at least all the privileges the law allows them, but they will always find that there are others willing to take less than this. For the latter class this clause of the Act is nothing more than a piece of ready-made underbidding,

I am at a loss to know why this clause should not be enforced, or why vagrant teachers should be allowed to oust their betters out of the profession by concocting with trustees to put a premium on breaking the law. There is the less excuse for not enforcing the law because the grievance of paying teachers quarterly (if it be a grievance) would not be a standing one. The habit once formed, no grievance would be felt.

ANOTHER TEACHER FROM THE COUNTY OF PEEL.

#### Summer Shorthand Class.

With the consent of the Hon. the Minister of Education, the undersigned will conduct a Shorthand Class in the Education Jepartment concurrently with the sessions of the Botany Class in July. For particulars address, THOS. BENGOUGH.

Shorthand Institute, Public Library Building, Toronto-

#### EDUCATION DEPARTMENT, ONTARIO,

TORONTO, 29th April, 1886.

SIR,-I have been informed that many High School Masters and Assistants would gladly avail themselves of a course of lessons in Botany during the summer vacation, provided arrangements were made by the Education Department for that purpose.

It has occurred to me that a series of lectures by some competent teacher each forenoon for three weeks, with field work in the afternoons, would be such a happy combination of both theory and practice as would secure the best results, and at the same time prove the least itksome to many who could not very well dispense with the relaxation which the summer vacation is intended to provide. The lectures would be given in the Public Hall of the Education Department by Mr. Spotton, M.A., and the field work directed according to his instructions.

As it is desirable to ascertain the number likely to take this course in order to complete arrangements, would you kindly let me know, at your earliest convenience, how many of your staff are prepared to join this class.

> Yours truly, GEO. W. ROSS.

#### CIRCULAR TO PUBLIC SCHOOL INSPECTORS.

#### EDUCATION DEPARTMENT, ONTARIO, TORONTO, May 1st, 1886.

SIR,-The Drawing Classes conducted at the Education Department, Toronto, during the last two summers will not be continued during the current year. It is nevertheless desirable in order still further to qualify teachers in this subject, that facilities of some kind should be offered for their self-improvement. Instead of the classes formerly taught at the Department it is now proposed to give a grant to each Inspectoral Division in which a class is formed for instruction in elementary drawing.

The conditions on which such classes may be formed are :--

z. The class must consist of at least ten persons holding a Public School Teacher's Certificate.

2. The teacher in charge must possess a legal certificate to teach drawing; or be approved of by the Education Department.

3. At least 30 lessons of two hours each must be given.

4. Teachers who attend this course will be allowed to write at the Departmental Examination in Drawing in April, 1887.

5. The Primary Drawing Course only shall be taught.

6. A grant of \$20 will be made for each class of ten pupils, but only one class will be paid for in any Inspectoral Division.

Will you be good enough to inform the teachers of your Inspectorate of these proposals in order that they may make the necessary arrangements for organizing classes.

> Yours truly, GEO. W. ROSS.

Minister of Education.

- We will send the Educational Weekly four months, and the New Silver Carols, postpaid, for \$1.00.
- We will send the Educational Weekly one year, and the New Silver Carols, postpaid, for \$2.10.
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- We will send the Educational Weekly one year, and the New Arithmetic, postpaid, for \$2.15.
- We will send the Educational Weekly four months, and Williams' Composition and Practical English, postpaid, for \$1.00.
- We will send the Educational Weekly one year, and Williams' Composition and Practical English, postpaid, for \$2.10.
- We will send the Educational Weekly three months, and Ayres' Verbalist and Orthoepist, postpaid, for \$1 00.
- We will send the Educational Weekly one year, and Ayres' Verbalist and Orthoepist, postpaud, for \$2.25.
- We will send the Educational Weekly one year and Stormonth's Dictionary (Full Sheep), for \$7.50.
- We will send the Educational Weekly one year, and Worcester's Dictionary (Full Sheep), for \$9.50.
- We will send the Educational Weekly one year, and Webster's Dictionary (Full Sheep), for \$11.50.
- We will send the Educational Weekly one year, and Lippincott's Gazetteer (Full Sheep), for \$11.50.

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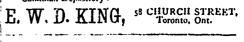
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# IMPORTANT ANNOUNCEMENT.

Teachers' EXCURSION

# COLONIAL AND INDIAN EXHIBITION, IN LONDON, ENGLAND. 1886.

At the request of several School Inspectors and Teachers, DR. MAY, the representative of the EDUCATION DEPARTMENT at the Colonial Exhibition, has applied for Excursion Rates from the principal Ocean Steamship Companies.

The lowest rates offered are from Niagara Falls to London, via New York and Glasgow, for \$100, including first-class to New York and return; first-class Ocean Steamship passage from New York to Glasgow and return; and third-class from Glasgow to London and return.

MR. C. F. BELDON, TICKET AGENT, NEW YORK CENTRAL R. R., NIAGARA FALLS, N.Y., will give further particulars as to Tickets, etc.

DR. S. P. MAY, COMMISSIONER of the EDUCATION DEPARTMENT for Ontario, at the Colonial and Indian Exhibition, London, England, will make arrangements on due notice, for Teachers to visit Educational Institutions and other places of interest in London.