CAMBRIDGE

Senate-House Examination Papers,

1860-61,

BEING

A COLLECTION OF ALL THE PAPERS

SET AT THE EXAMINATIONS FOR THE DEGREES, THE VARIOUS TRIPOSES, AND THE THEOLOGICAL EXAMINATION:

ALSO, THE

CHANCELLOR'S MEDALS AND SMITH'S PRIZES:

TOGETHER WITH THE LISTS OF CANDIDATES AND OF THOSE EXAMINED AND APPROVED.

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EXAMINATION FOR CHANCELLOR'S MEDAL,

LEGAL STUDIES, February, 1861.

EXAMINERS:

John Thomas Abdy, ll.d., *Trinity Hall.*
Joseph Sharpe, ll.d., *Jesus College.*
Herbert Broom, m.a., *Trinity College.*
Charles Stuart Calverley, m.a., *Christ's College.*

CONSTITUTIONAL HISTORY.

1. What circumstances had, (it is said,) placed Charles at his accession in antagonism with the people? What views are taken by Clarendon, Guizot, and Hallam, respectively, about the question 'Who was the aggressor' in the quarrel between him and the Parliament?

2. Give a sketch of the rise and principles of the Independents: and of the circumstances which led to the decline of the Presbyterian party.

3. Compare the situation of the English Church in the latter part of Elizabeth's reign with its situation under James and Charles.

4. Give some account of the Council of the North: and of the Star Chamber. When and how was the latter Court abolished? How far do you consider that Charles himself was answerable for this or any other 'illegal jurisdictions'?

5. What were the leading topics discussed at Uxbridge? and on what grounds does Hallam think that an agreement was out of the question?

What was, on the whole, the character of the Long Parliament, as estimated from a survey of its measures, beneficial or otherwise?

6. Trace the gradual progress of the Republican party from 1645 to 1648.

7. What considerations may have led Charles to take refuge in Scotland, and how did that step affect his position and prospects? Can any apologies be made for the surrender of him by the Scots?

8. State briefly any political arguments that have been advanced in favour of the King's execution.

THE STATE TRIAL.

1. State any disadvantages to which the prisoner was subjected in the manner and conduct of the trial. What were the leading charges against him? How did he answer the one concerning billeting soldiers in Ireland?

2. Give an outline of Mr. Lane's arguments for the defence, and of Lord Digby's objections to the bill of attainder. Has any body been subsequently condemned by bill of attainder?

3. How does Hallam gather that Strafford was 'party in a conspiracy to subvert the fundamental laws and liberties of his country': and, if he were, how far would he be guilty of treason?

4. What part had Strafford taken in the Petition of Right? What were the origin and objects of that Petition? What is meant by 'Ship-money': and is there any proof that it was countenanced by Strafford?

ROMAN LAW.

1. EXPLAIN accurately the meaning and object of the Roman division of Actions into Real and Personal, with reference to Rights.

Why is the term Vindicatio applied to Real actions?

2. Give a short sketch of the changes in the Law of Actions.

3. Mention the different parts of the Formula, and explain the particular object of each part.

4. Explain fully the effect of the Exceptio, with reference (*a*) to the pleadings and (*b*) the proofs in an action under the *formulary* system. What changes were introduced herein by Justinian's alterations?

5. By what special plea was our principle of law 'nemo debet bis vexari pro eadem causa' maintained at Rome?

6. Was there any general limitation in time of the Plaintiff's right to sue under the formulary process, and under Justinian's system?

7. CH. Principio eam esse dico *liberam*. THR. hem!
CH. *Civem* Atticam. THR. hui!
CH. Meam *sororem*. THR. os durum!

TERENT. *Eunuch.* Act. IV. sc. 7.

Explain the allusion here to the Actiones Præjudiciales.

8. What was the analogous form of an action of ejectment at Rome? In what important points did the Prætorian remedy differ from that given Jure Civili?

9. "Interdicta omnia *licet in rem videantur concepta*, vi tamen ipsa personalia sunt." *D.* 43. 1.

From the passage in italics can any argument be advanced against Savigny's theory, that Interdicts belong to the *law of obligations?* How does he overcome that difficulty, as well as this other that in the Roman Law they are *not classed with obligations?*

10. What was the Interdict applied for in Cæcina's case? To what set of Judges was that case referred? Draw a formula embodying the question of fact remitted to them for trial.

11. Is there any reason for supposing that there was a difference between Real actions and Possessory interdicts in the amount of evidence required to support the Plaintiff's claim?

12. Describe briefly the Actiones Institoria, Exercitoria, and Tributoria. Which was likely to have been the most important of these from the peculiar condition of Roman Society?

13. What was the Sponsio? How was it introduced into the formula?

14. Omnia judicia absolutoria sunt. GAII *Comm.* IV. 114.

Explain this; and state the effect produced by the Litis contestatio upon this principle.

INTERNATIONAL LAW.

1. UPON what, considered in an international point of view, is the jurisdiction of Courts of Justice founded?

2. Can the sovereign prince of one country sue or be sued in the courts of another country? and if so, state in what cases.

3. *A* a British subject destroys, in a foreign country, the house and furniture of *B* another British subject, and *A* also assaults *B*.

Under what circumstances can *B* have a remedy against *A* in the English Courts, and for which of the above injuries?

4. *A* a resident in England makes a parol contract with *B* a British subject resident in France, to employ *B* as his agent, the agency to be for one year and to commence at and from a future day. By the law of France this contract, although not in writing, can be enforced by the Courts in that country. By the 4th section of the statute of Frauds it is enacted, "That no action shall be brought whereby to charge any person upon any agreement that is not to be performed within the space of one year from the making thereof, unless the agreement upon which such action shall be brought or some memorandum or note thereof shall be in writing and signed by the party to be charged therewith."

Can *B* sue *A* upon the contract, in the English Courts? Give the reasons for your opinion.

5. A debt is contracted in a foreign country by whose laws the debtor is not liable to arrest.

The debtor and creditor are both subjects of the country in which the debt is contracted.

The debtor comes to reside in England: can the creditor arrest him?

6. Define a "Judgment in rem" and a "Judgment in personam." Give instances of the different descriptions of each, and point out whether any of the instances you specify are or are not conclusive in foreign countries.

7. With what system of law must the proofs in the following cases accord?

(1) The due execution of wills and testaments of moveables and immoveables.

(2) Deeds or conveyances of property, required to be registered by the law of the country where the property is situate, but not required to be registered by the law of the country in which legal proceeding are pending.

8. How do the courts of justice of one country arrive at the knowledge of the laws of another country?

9. In what cases can a person resident out of the jurisdiction of the English Courts be sued in such courts?

10. How can the Judgment of a foreign court be enforced in this country?

11. Enumerate some of the principal grounds of objection to the enforcing a foreign judgment.

12. (1) *A* sues *B* in a foreign court and obtains judgment against him.
(2) *A* sues *B* in a foreign court and judgment is given for *B*.

B afterwards comes to England: can *A* sue *B* upon the original causes of action in the above cases?

13. State briefly the case of the fugitive slave Anderson. Give the principal arguments for and against his extradition.

ENGLISH LAW.

1. WHAT is meant by a presumption of law? Into what two classes are legal presumptions reducible? Give instances of each.

2. Mention various rules or principles of law illustrating either class of legal presumptions above referred to.

3. To what extent may a relaxation of the strict rules of evidence be allowed on a criminal trial?

4. "Non refert quid notum sit judici, si notum non sit in formâ judicii." What is the meaning of this maxim, and how does it practically apply?

5. Is a wife admissible as a witness for or against her husband (1) in a civil, (2) in a criminal proceeding?

6. What was the ancient office of Conservator of the Peace? And how were Conservators of the Peace appointed?

7. What are the principal powers given to Justices of the Peace by their Commission?

8. State shortly the ordinary mode of proceeding before a Justice of the Peace on a criminal charge.

9. State the purport of such Statutory provisions as have been enacted during the present reign for the protection of Justices of the Peace in the performance of their duties.

10. What mode of procedure may be adopted against a Justice who acts corruptly or is guilty of misconduct in the execution of his office?

11. When will a Justice of the Peace be entitled to Notice of action; and what may be the consequence of omitting to give him due Notice?

12. Mention three leading principles characteristic of the system of judicial evidence which obtains in this country.

13. "Res inter alios acta alteri nocere non debet." Explain fully the practical operation of this maxim, and indicate its principal limitations. At what early period can it be proved to have been recognized in our Courts?

14. What is meant by "backing" a warrant issued by a Justice of the Peace for the apprehension of an offender? When is it necessary that the warrant should be "backed," and when not so?

ADJUDGED TO

Lazarus Threlfall Baines, B.L., Trinity College.

EXAMINATION FOR CHANCELLOR'S MEDALS,

CLASSICAL STUDIES, March, 1861.

EXAMINERS:

The Vice-Chancellor.
Richard Okes, D.D., *Provost of King's College.*
William Whewell, D.D., *Master of Trinity College.*
Henry Wilkinson Cookson, D.D., *Master of St. Peter's College.*
James Cartmell, D.D., *Master of Christ's College.*
William George Clark, M.A., *Trinity College.* (Public Orator.)
William Hepworth Thompson, M.A., *Trinity College.*
Charles Kingsley, M.A., *Magdalene College.*
Joseph Barber Lightfoot, M.A., *Trinity College.*

I. 1. Give a brief sketch of the plan of the Odyssey.

2. Quote from the Homeric poems any inconsistencies in the story which you may remember, and mention any portions which may have struck you as being inferior in poetical merit to the rest.

What inference would you draw, respecting the authorship of the poems?

3. Discuss the etymology and signification of the following words: *ἄρκιος, δείλη, ἠλίβατος, οὖλος, ποιπνεύειν.*

4. Scan the following line:

ἕως ὁ ταῦθ' ὥρμαινε κατὰ φρένα καὶ κατὰ θυμόν.

II. Translate:

Beginning, *Αὐτοὶ δ' εἰς ἀγορὴν κίον ἀθρόοι, οὐδέ τιν' ἄλλον, κ.τ.λ.*
Ending, *οὕνεκά οἱ φόνου αἰπὺν ἐράπτομεν, οὐδ' ἐκίχημεν.*

Homer, *Odyss.* 261—279.

III. Translate:

Beginning, *Ἥλιον μαρτυρόμεσθα δρῶσ' ἃ δρᾶν οὐ βούλομαι. κ.τ.λ.*
Ending, *ἐς δόμους δ' ἡμεῖς ἄφαυτοι δυσόμεσθ' Ἡρακλέους.*

Euripides, *Hercules Furens,* 858—874.

1. Translate the above passage as it stands.

2. Mention any emendations which may occur to you: state which reading you prefer, and give your reasons.

IV. Translate, with brief notes:

Beginning, ΠΑΣ. *Εἶτ' ἄνδρα τῶν αὐτοῦ τι χρὴ προϊέναι; κ.τ.λ.*
Ending, ΣΤΡΕΨ. *θαυμασίως ἥσθην θεοῖς,*
καὶ Ζεὺς γέλοιος ὀμνύμενος τοῖς εἰδόσιν.

Aristoph., *Nubes,* 1085—1112.

TRANSLATE *into* GREEK IAMBIC TRIMETERS:

The season comes with you
When love that's innocent may well be wise.
But not inevitably one with wisdom
Is innocent love at all times and with all.
Love changes with the changing life of man:
In its first youth, sufficient to itself,
Heedless of all beside, it reigns alone,
Revels or storms, and spends itself in passion.
In middle-age,—a garden through whose soil
The roots of neighbouring forest trees have crept,—
It strikes on stringy customs bedded deep,
Perhaps on alien passions; still it grows
And lacks not force nor freshness: but this age
Shall aptly chuse as answering best its own
A love that clings not nor is exigent,
Encumbers not the active purposes,
Nor drains their source; but proffers with free grace
Pleasure at pleasure touched, at pleasure waived,
A washing of the weary traveller's feet,
A quenching of his thirst, a sweet repose
Alternate and preparative, in groves
Where loving much the flower that loves the shade,
And loving much the shade that that flower loves,
He yet is unbewildered, unenslaved,
Thence starting light and pleasantly let go
When serious service calls.

TRANSLATE these passages, adding explanations where required:

1. Beginning, *Οὕτω πολλὴν περιωπὴν τῶν ἡμῖν ἐς τὰ μέγιστα διαφόρων ποιούμεθα. κ.τ.λ.*
   Ending, *τοὺς ἐναντιουμένους περιείδοιμεν.*—THUCYDIDES, IV. 86.
2. Beginning, *Ἀναγιγνώσκει μοι πρόκλησιν μακράν, κ.τ.λ.*
   Ending, *ἡλίκον ἐστὶ πλεονέκτημα τὸ καταπεπλῆχθαι τὸν βίον.*
   DEMOSTHENES, *Pantæn.* p. 978.
3. Beginning, *ΣΩ. Ἐμοὶ μὲν φαίνεται τὰ μὲν ἄλλα τῷ ὄντι παιδιᾷ πεπαῖσθαι· κ.τ.λ.*
   Ending, *καὶ προτεινάμενος ἐπῄνησεν ὡς μεγίστων αἴτιον ἡμῖν ἀγαθῶν.*—PLATO, *Phædrus*, p. 265.
4. Beginning, *Τόποι δ' εἰσὶ τῶν φαινομένων ἐνθυμημάτων, κ.τ.λ.*
   Ending, *τὸ γὰρ λόγου ἄξιον οὐχ ἁπλῶς λέγεται.*
   ARISTOTELES, *Rhet.* II. 24.

TRANSLATE *into* GREEK PROSE:

But nothing is more false, than that despotism is the constitution of any country in Asia, that we are acquainted with. It is certainly not true of any Mahommedan constitution. But if it were, do your Lordships really think, that the nation would bear, that any human creature would bear to hear an English Governour defend himself on such principles? or, if he can defend himself on such principles, is it possible to deny the conclusion, that no man in India has a security for anything, but by being totally independent of the British Government? Here he has declared his opinion, that he is a despotic prince, that he is to use

arbitrary power, and of course all his acts are covered with that shield. "I know," says he, "the constitution of Asia only from practice." Will your Lordships submit to hear the corrupt practices of mankind made the principles of government? No; it will be your pride and glory to teach men entrusted with power, that, in their use of it, they are to conform to principles, and not to draw their principles from the corrupt practice of any man whatever. Was there ever heard, or could it be conceived, that a governour would dare to heap up all the evil practices, all the cruelties, oppressions, extortions, corruptions, briberies, of all the ferocious usurpers, desperate robbers, thieves, cheats, and jugglers, that ever had office from one end of Asia to another, and consolidating all the mass of the crimes and absurdities of barbarous domination into one code, establish it as the whole duty of an English Governour? I believe that till this time so audacious a thing was never attempted by man.

BURKE.

TRANSLATE *into* ENGLISH, with short explanatory notes:

I. Beginning, ST. Emortuom ego me mavelim leto malo, etc.
Ending, Certum est, malam rem potius quæram cum lucro!
PLAUT. *Aulul.* Act. IV. Sc. 2.

II. Beginning, Vivo prætervehor ostia saxo, etc.
Ending, Hinc Drepani me portus et illætabilis ora
Accipit.
VIRG. *Æn.* III. 688.

Draw a map of the coast described, and insert in their appropriate places the several geographical names.

III. Beginning, Ætatis cujusque notandi sunt tibi mores, etc.
Ending, Semper in adjunctis ævoque morabimur aptis.
HOR. *Ars Poet.* 156.

IV. Beginning, Attice, facundæ renovas qui nomina gentis, etc.
Ending, Ludere, cum liceat currere, pigritia est.
MARTIAL, VII. 31.

TRANSLATE *into* LATIN VERSE:

The Sun, when he hath spread his rays,
And shewed his face ten thousand ways;
Ten thousand things do then begin
To shew the life that they are in.
The heaven shews lively art and hue
Of sundry shapes and colours new,
And laughs upon the Earth; anon
The earth, as cold as any stone,
Wet in the tears of her own kind,
'Gins then to take a joyful mind.
For well she feels that out and out
The sun doth warm her round about,
And dries her children tenderly,
And shews them forth full orderly:
The mountains high, and how they stand,
The valleys and the great main land!
The trees, the herbs, the towers strong,
The castles, and the rivers long.

TRANSLATE, giving such explanations as may be necessary:

1. Beginning, Quamquam satis magno argumento esse debet, etc.
   Ending, vel aliis inimicis reus hac lege ipsa factus esset.
   CIC. *pro Cluentio*, c. 41.
2. Beginning, Majus aliquid et excelsius a Principe postulatur, etc.
   Ending, hæc omissa funditus rem publicam trahet.
   TACIT. *Ann.* III. c. 53, 54.

For LATIN PROSE:

The ancient loyalty which had attached the yeoman to his feudal superior had given place to a deep and vindictive hatred. The lords, if less guilty personally than others of the landowners, did not care to compromise themselves by dangerous interference. The interests of the higher class were combined against the lower, and the courts of law were themselves infected. What was to be done? Principle and prudence would perhaps have united to recommend the Protector to set himself an example of abstinence from the pursuit of personal aggrandizement, before he meddled with others. As church and chsntry lands fell in, he would have done wisely if he had neither kept them for himself, nor distributed them among his adherents; if he had disposed of them as national property and applied the proceeds to the restoration of the currency. Perhaps he was not wholly responsible for having missed seeing what his own and others' interests combined to conceal from him. Unhappily for himself, for his fortune and reputation, he chose a course for himself, generous in intention, yet rash and dangerous and deliberately against the opinion of the rest of the council. He was constitutionally haughty, and he was conscious of a noble and honourable purpose. He determined to enforce the statutes; and as the courts of law were tedious and corrupt, to follow the perilous counsel of Latimer, who recommended him to follow Solomon's example, and hear the causes of the poor himself. Paget, to whom he owed the Protectorate, and to whose advice he had promised to listen, warned him to be cautious. Let him strengthen the hands of the magistrates, keep order, and prevent breaches of the peace. Let him ascertain privately who were the greatest offenders against the tillage statutes, send for them separately, reason with them, and, if necessary, punish them. But, if he valued either his own welfare, or the quiet of the kingdom, let him not attempt to interfere by force; above all, let him not meddle with the courts of law.

ADJUDGED TO.

FIRST PRIZE.

Edwin Abbott Abbott, B.A., St. John's College, 1st Classic and 7th Senior Optime, 1861.

SECOND PRIZE.

Douglas Close Richmond, B.A., St. Peter's College, Bell's Scholar, 5th Classic and bracketted 23rd Senior Optime, 1861.

SMITH'S PRIZE EXAMINATION PAPERS.

JANUARY, 1861.

EXAMINERS:

JAMES CHALLIS, M.A., *Plumian Professor.*
GEORGE GABRIEL STOKES, M.A., *Lucasian Professor.*
JOHN COUCH ADAMS, M.A., *Lowndean Professor.*
WILLIAM WHEWELL, D.D., *Master of Trinity College.*

By Professor Challis.

1. INDICATE methods of expanding a^x and $\sin\frac{x}{m}$.

Shew that the former function may be expanded exclusively by algebra, and state the reason that the expansion of the other necessarily involves the principle of limiting ratios, or of the differential calculus.

2. The impossible roots of the equation $x^3 + qx + r = 0$ being put under the form $\alpha + \beta\sqrt{-1}$, shew that $\beta^2 = 3\alpha^2 + q$.

3. Assuming that the biquadratic equation $x^4 + qx^2 + rx + s = 0$ has roots of the form $\alpha + \beta\sqrt{-1}$, shew that the values of α and β may be found by the equations,

$$64\alpha^6 + 32q\alpha^4 + (4q^2 - 16s)\alpha^2 - r^2 = 0,$$

$$\beta^2 = \alpha^2 + \frac{q}{2} + \frac{r}{4\alpha}.$$

4. A body describes an orbit by the action of the force

$$\frac{\mu}{r^2}.\{1 + \Sigma.A\sin(m\theta + c)\},$$

tending to a fixed point, r and θ being the polar co-ordinates of its position at any time referred to that point as origin; find the equation of the orbit.

5. The position in space of a Planet at the instant of an observation is referred to three rectangular axes having their origin at the place of the observer, the axes of x and y being parallel to the plane of the Earth's equator, and the former directed to the first point of Aries: given the local sidereal time of observation, transfer the origin of co-ordinates to the center of the Earth, taking account of the Earth's figure.

6. On the supposition of the Earth's spheroidal form, find an approximate value of the length of an arc of the meridian, intercepted between two latitudes known by astronomical observation.

7. In what manner might a navigator, landing on an unknown island, determine its geographical position by means of a sextant, a chronometer, and a Nautical Almanac?

8. Three equal and perfectly smooth balls are held in contact on a perfectly smooth plane, while another of the same size rests upon them: one of the balls being fixed to the plane, and the others left at liberty to move, required the motions.

9. Describe instrumental arrangements and a method of observing, by which observations of the N.P.D. of the Sun's North and South Limbs, and of the transits of the East and West Limbs, are practicable with a Transit Circle at the same meridian passage.

10. Eliminate y by differentiation from the equations

$$\frac{d^2x}{dt^2} + a\frac{dx}{dt} + b\frac{dy}{dt} + cx + ey + f = 0,$$

$$\frac{d^2y}{dt^2} + a'\frac{dy}{dt} + b'\frac{dx}{dt} + c'y + e'x + f' = 0,$$

and integrate the resulting equation.

11. Explain the principle of the method of multipliers, and apply it in integrating simultaneously the two differential equations in the preceding question.

12. Describe the construction of the collimating eye-piece, and mention the astronomical uses to which it is applied.

13. Prove that in any instance of the steady motion of an elastic fluid, the equation

$$\frac{du}{dx} + \frac{dv}{dy} + \frac{dw}{dz} = 0$$

is true to terms inclusive of the square of the velocity, u, v, w, being the resolved parts of the velocity in the directions of the axes of x, y, and z, no accelerative force acting.

14. Shew that motions of an incomprehensible fluid which severally satisfy the equation of continuity of mass, satisfy it conjointly.

Prove also that this theorem is true of the small motions of a compressible fluid to the first power of the velocity, and of its steady motions to the second power of the velocity, no accelerative force acting.

15. A small hole is made in a partition separating two reservoirs of unlimited extent, at the depth h below the surface of the water which stands highest, and the depth k below the other surface: how may it be shewn that the water will issue through the hole with the velocity $\sqrt{(2g)}\{\sqrt{(h)} - \sqrt{(k)}\}$ nearly?

16. Supposing that $x^2 + y^2 + z^2 = r^2$ and $z = r\cos\theta$, change the variables in the equation

$$\frac{d^2\phi}{dx^2} + \frac{d^2\phi}{dy^2} + \frac{d^2\phi}{dz^2} + k^2\phi = 0,$$

ϕ being assumed to be a function of r and θ.

17. Given the partial differential equations,

$$\frac{d^2.r\phi}{dr^2} + \frac{1}{r^2}\cdot\left(\frac{d^2.r\phi}{d\theta^2} + \frac{d.r\phi}{d\theta}\cot\theta\right) + k^2.r\phi = 0,\ldots\ldots(1),$$

$$\frac{d^2.r\phi}{d\theta^2} - \frac{d.r\phi}{d\theta}\cot\theta = 0,\ldots\ldots(2), \qquad \frac{d^2.r\phi}{d\theta^2} - 2\frac{d.r\phi}{d\theta}\cot 2\theta = 0,\ldots\ldots(3),$$

shew how to find a particular form of ϕ which will satisfy (1) and (2), and another which will satisfy (1) and (3).

18. Give a brief account of the successive improvements that have been made in the determinations of the positions of heavenly bodies, with respect both to instrumental means, and to the correction of errors by which the positions as observed are affected.

19. Shew that the operations in the Differential Calculus indicated by the symbol d, and those in the Calculus of Variations indicated by the symbol δ, are equally performed, in the solution of problems of maxima and minima, on the assumption of continuity of value, and state what is the analytical distinction between the continuity in the former calculus and that in the other.

20. Prove from the laws of motion that no particle of matter, whether solid or fluid, changes either its velocity, or the direction of its motion, *per saltum*, if it be acted upon only by finite accelerative forces.

Obtain an equation which expresses that the motion of a fluid conforms to this law.

21. Account for the existence of particular solutions of differential equations between two variables, and explain analytically why a problem which is solved by the particular solution may always be solved by differentiation alone.

22. Obtain a general approximate expression for the magnifying power of any optical instrument, and apply it to determine the circumstances most favourable for distinct vision under high magnifying powers, with an Astronomical Telescope, and with the compound Microscope.

23. A cylinder of given radius and axis of unlimited extent, revolves about the axis with a uniform angular velocity in an elastic fluid, and impresses by friction on the fluid in contact with its surface a velocity which finally has a constant ratio to that of the surface: shew that when the motion has become steady, the fluid revolves about the cylinder with a velocity which varies inversely as the distance from the axis.

24. What explanation does the Undulatory Theory of Light give of the fact that when rays pass perpendicularly through a plate of glass, the light reflected at the surface of incidence is of the same phase as the incident light, and that reflected at the surface of emergence of contrary phase? Do undulations in air present analogous phænomena?

By Professor Stokes.

1. Prove that $(Mx + Ny)^{-1}$ cannot be an integrating factor of $M + N\dfrac{dy}{dx} = 0$, unless the equation be homogeneous.

2. Trace the curve

$$(x^2 + y^2)(a^2c^2x^2 + b^4y^2) - 2a^2b^2c^2x^2 - (a^2 + c^2)b^4y^2 + a^2b^4c^2 = 0,$$

and examine its change of form as b passes through the value a or c. Find also the area, supposing b to lie outside the limits a and c.

3. In what manner would you proceed if you wished to obtain numerically the sums of the following slowly convergent infinite series?

$$(1)\quad 1 - 2^{-\frac{1}{2}} + 3^{-\frac{1}{2}} - 4^{-\frac{1}{2}} + \ldots\ldots,$$

$$(2)\quad 1 + 2^{-\frac{3}{2}} + 3^{-\frac{3}{2}} + 4^{-\frac{3}{2}} + \ldots\ldots.$$

4. If $F(x) = \sqrt{\dfrac{2}{\pi}}\displaystyle\int_0^\infty \phi(a)\cos axda, \qquad f(x) = \sqrt{\dfrac{2}{\pi}}\displaystyle\int_0^\infty \psi(a)\sin axda,$

shew that the functions F and ϕ, and also f and ψ, are reciprocal; and thence from the known values of $\int_0^\infty e^{-gx}\cos cxdx$ and $\int_0^\infty e^{-gx}\sin cxdx$ deduce those of two other definite integrals.

5. In a rainbow of any order, shew that a small pencil of rays in the primary plane in the middle of its course within the drop has its focus at the middle point of incidence, or else at an infinite distance, according as the number of reflections is odd or even.

6. The altitudes of two known stars are taken with a theodolite which is clamped in azimuth, find the latitude of the place, and point out the circumstances which are favourable to accuracy in the determination.

7. In a heliostat of such a construction as to involve but one reflection, shew that a line drawn through any fixed point perpendicular to the plane of the mirror will describe in the 24^h an elliptic cone, the section of which by the plane of the equator is a circle which is described uniformly. Examine the case in which the rays are reflected towards a point the south polar distance of which is equal to the north polar distance of the Sun.

8. Express the position of the invariable plane of a system of bodies not acted on by forces external to the system in terms of quantities depending on the motions of and the motions about the centers of gravity of the several bodies.

9. A planet circulates in a slightly resisting medium; find the effect of the resistance on the angle described in a long time, the undisturbed orbit being supposed circular.

10. A uniform flexible and inextensible string at rest in space is pulled by an impulsive force applied at one end in the direction of the tangent; shew that the impulsive tension (T) is determined by the equation $\frac{d^2T}{ds^2} = \frac{T}{R^2}$, where R is the radius of absolute curvature; and find the components of the initial velocity at any point in the directions of the tangent, radius of absolute curvature, and normal to the osculating plane.

11. A slender fluid ring revolves uniformly round a center of force situated at its center, the force varying inversely as the square of the distance; find approximately the form of a section of the ring.

12. If a mass of steel be permanently magnetized in any manner, shew that the effect of the Earth's magnetism upon it will be the same as if it were replaced by a slender bar, fixed relatively to the mass, and uniformly and longitudinally magnetized. What is meant by the *magnetic moment* of a magnet?

13. When a small flame is viewed by reflection in a slightly tarnished looking glass some way off, at a moderate angle of incidence, a series of coloured bands is seen accompanying the image; explain the formation of these bands, and calculate their forms.

14. A small solid sphere is contained in an infinite mass of air not acted on by external forces; assuming that when the sphere moves through the air at rest, along a straight line, with a small velocity v, the resistance is expressed by $a\frac{dv}{dt} + bv$, determine the motion of the sphere produced by an infinite succession of plane waves of sound, in which the disturbance is expressed by a sine or cosine.

15. The motion of an indefinitely extended and slightly disturbed homogeneous elastic medium, not acted on by external forces, nor subject in the position of equilibrium to internal tensions, being determined according to the method of Lagrange by the equation

$$\iiint \rho\left(\frac{d^2u}{dt^2}\delta u + \frac{d^2v}{dt^2}\delta v + \frac{d^2w}{dt^2}\delta w\right) dxdydz = \iiint \delta V dxdydz,$$

where u, v, w are the displacements parallel to the rectangular axes of x, y, z, and V is a function of the nine differential coefficients of u, v, w with respect to x, y, z, it is required to express by means of the function V the normal and tangential tensions at any point on planes parallel to the co-ordinate planes.

Write short dissertations on the following subjects:

(1) On the signification and integration of the equation

$$Pdx + Qdy + Rdz = 0.$$

(2) On Clairaut's Theorem.

(3) On the colours of thin crystalline plates in polarized light.

By Professor Adams.

1. THE coefficients of the algebraical equation $f(x) = 0$ are all integers; show that if $f(0)$ and $f(1)$ are both odd numbers, the equation can have no integral root.

2. Of a series of quantities a_1, a_2, a_3, &c., the first two are given, and each of the others is a mean proportional between the two immediately preceding it; find the limit to which a_n approaches as n is indefinitely increased.

3. If m be any positive integer, prove that the integer next greater than $(3 + \sqrt{5})^m$ is divisible by $2^{\frac{m}{2}+1}$ when m is even and by $2^{\frac{m+1}{2}}$ when m is odd.

4. If both x and y lie between the limits $-\frac{1}{2}$ and $+\frac{1}{2}$, and every value between those limits is equally probable, find the probability that the value of $x + y$ lies between $-m$ and $+m$, where m is any quantity not greater than 1.

5. A conic section is circumscribed about a given quadrilateral: show that its center always lies in another conic section which passes through the middle points of the sides and diagonals of the quadrilateral, as well as through the point of intersection of the diagonals and the points in which the two pairs of opposite sides meet when produced.

6. Find the envelope of all chords of a conic section which subtend a given angle at the focus.

7. C is the middle point of an arc ACB of finite and continuously varying curvature, the difference between the radii of curvature at A and B being ultimately $m.AB$. If R be the radius of curvature at C, show that the chord AB ultimately cuts the tangent at C in a point whose distance from C is $\frac{3R}{m}$.

Also show that the angle which AB makes with the tangent at C is ultimately equal to two-thirds of that which the line joining C with the middle point of AB makes with the normal at C.

8. If x and y be connected by the equation

$$\frac{d^2y}{dx^2} + xy = 0,$$

and if when $x = 0$, $y = 0$ and $\frac{dy}{dx} = 1$, find the value of y when $x = 1$, so that the error shall be less than ·0001.

9. Investigate the different kinds of contact which exist between a curve surface and its tangent plane at any point according as

$$\frac{d^2z}{dx^2}\cdot\frac{d^2z}{dy^2}-\left(\frac{d^2z}{dxdy}\right)^2$$

is positive, negative, or zero.

In a surface which can be generated in two ways by the motion of a straight line, if the generating lines through any point be projected on the plane of xy, and if α, β be the angles which those projections make with the axis of x, prove that

$$\frac{1}{2}(\tan\alpha+\tan\beta)=-\frac{\dfrac{d^2z}{dxdy}}{\dfrac{d^2z}{dy^2}},\ \text{and}\ \frac{1}{2}(\cot\alpha+\cot\beta)=-\frac{\dfrac{d^2z}{dxdy}}{\dfrac{d^2z}{dx^2}}.$$

10. A, B, C are the angular points of a spherical triangle, A', B', C' the middle points of the sides a, b, c which are respectively opposite to them, O the center of the sphere; prove that the volumes of the triangular pyramids $OA'B'C'$, $OAB'C'$, $OBA'C'$, $OCA'B'$ are respectively proportional to

$$1,\quad \cos\frac{a}{2},\quad \cos\frac{b}{2},\quad \cos\frac{c}{2}.$$

11. The surface of a given circle is self-luminous and of uniform brightness; find the illumination at any point of a plane which is parallel to the plane of the circle and at a given distance from it: supposing, as usual, that the intensity of radiation from a luminous element in any direction varies as the cosine of the angle between that direction and the normal to the luminous surface.

Also find the total quantity of light which falls upon a circle of given radius, the line joining the centers of the two circles being perpendicular to each of the planes.

12. A body moves in a plane about a fixed point under the action of given forces. If the areal velocity and the direction of motion of the body at a proposed point be known, find the semi-latus rectum of the elliptic orbit which has a contact of the second order with the real orbit at that point, its focus being at the given fixed point.

Also find the changes produced in an indefinitely small time in the eccentricity and in the position of the apse of this elliptic orbit, in terms of the corresponding change of the semi-latus rectum.

13. If the force acting on the Moon relatively to the Earth be resolved into two forces, one in the plane of the orbit and the other perpendicular to the ecliptic, prove that the latter force

$$=S-Ps+T\frac{ds}{d\theta},$$

employing the usual notation.

Hence derive the equation

$$\frac{d^2s}{d\theta^2}+s=-\frac{S-Ps+T\dfrac{ds}{d\theta}}{H^2u^3},$$

where H denotes twice the Moon's areal velocity.

14. Explain clearly the various means by which we can compare the mass of the Earth,

(1) With that of the Sun,
(2) With that of the Moon,
(3) With that of a given volume of water,

pointing out what are the data on our imperfect knowledge of which the chief uncertainty of the result in each case depends.

15. If ω_1 denote the angular velocity of a body at any time about an axis fixed in space, and ω' the angular velocity at the same time about an axis fixed in the body, prove that at the instant when these two axes coincide

$$\frac{d\omega'}{dt} = \frac{d\omega_1}{dt}.$$

Point out clearly why this needs proof.

Also show that at the same instant

$$\frac{d^2\omega'}{dt^2} = \frac{d^2\omega_1}{dt^2} + \omega_3\frac{d\omega_2}{dt} - \omega_2\frac{d\omega_3}{dt},$$

ω_2 and ω_3 being the angular velocities about the other two axes in any rectangular system.

16. A pencil of common light is incident on the surface of a uniaxal crystal. Shew clearly how to determine the course of the light after refraction into the crystal.

When the axis of the crystal is in the plane of incidence and makes any given angle with the surface, investigate a formula for finding the angle of refraction of the extraordinary ray corresponding to any given angle of incidence; and show that in the particular case when the axis lies in the surface, the tangents of the angles of refraction of the ordinary and extraordinary rays are to each other in a constant ratio.

By the Master of Trinity.

1. If ABC be a straight line, and on AB, BC, AC, as diameters, semicircles be described on the same side of the line, find (by a construction) a circle equal to the area bounded by the three semicircles.

2. Also inscribe in this area another circle and find its area.

3. A uniform straight rod hangs in a horizontal position from two vertical strings of unequal lengths: the rod being slightly disturbed but remaining horizontal, find its motion.

Shew that the small longitudinal and transverse vibrations will be coexistent and independent.

4. Of all spherical segments of equal curved surface, the hemisphere has the greatest content.

5. A great number of small soft spheres in regular arrangement occupy a space; supposing the space to be compressed so that they become polyhedrons, what will be the form of the polyhedron, and how much will the space be contracted?

6. Let $ABCDE$ be a polygon; produce the sides BA to a, CB to b, DC to c, and so on; let aB, bC, cD, &c. be levers, resting at their outer extremities a, b, c, &c. on props, and at their inner extremities B, C, D, &c. each on the next; weights being hung at a given point of each of the levers, find the pressures at all the points, A, a, B, b, C, c, &c. (Omi the weights of the levers).

7. Describe Horner's method for the solution of equations. Apply it to solve the equation $x^3 - 2x - 5 = 0$, to 5 places of decimals.

8. Compare the motion of the nodes and apse of one of Jupiter's satellites with one of Saturn's.

9. Newton (*Princ.* Lib. I. Prop. 66, Cor. 19) proves that an equatorial ring of water, acted upon by the sun and moon, would have its greatest height at the octants after syzygies: prove this. How does it apply to the tides?

10. A projectile, acted upon by gravity, moves in a medium of which the resistance is proportional to the velocity: determine the curve in which it moves, and where it strikes the horizontal plane again.

11. If a cycloidal pendulum oscillate in a medium of which the resistance is as the mth power of the velocity (the density of the medium being small), find the law of decrement of the arcs described in successive oscillations.

12. "Motus solis medius a nodo [lunæ] definitur per medium proportionale geometricum inter motum ipsius solis medium, et motum illum mediocrem quo sol celerrime recedit a nodo in quadraturis." (Machin, as given by Newton, *Princ.* Lib. III. Prop. 33, Scholium). Prove this.

13. Given the requisite observations, shew how the *parabolic* orbit of a Comet moving in the ecliptic, may be found: (the earth's orbit being circular.)

14. Define principal axes of rotation. Shew that every body has three such axes.

15. In the case of an oblique parallelopiped, what are the positions of these axes?

16. A fluid is acted upon by gravity, and also, at each point, by a horizontal force proportional to the distance from a vertical plane. Shew that equilibrium is impossible, and determine what *steady* motion is possible.

17. Give Laplace's explanation of the phenomena of Double Refraction. Also Newton's. Shew the errors of both. Give the true explanation.

18. Trace the curves to which the following equations belong:

$$x^3 - 3xy + y^3 = 0\,;\ x^4 - 4xy + y^4 = 0,\ x^4 - 4xy + y^3 = 0.$$

19. If a small magnet exist at the center of the earth, what will be the law of magnetic dip with reference to th emagnetic equator?

20. A body moves in a given curve of double curvature; what is the condition requisite that it may be retained in this curve by forces tending to two given centers? The condition being fulfilled, find the forces to the two centers.

If the curve be the regular screw-thread on a cylinder, and the centers two given points in the axis, apply this.

21. At a given time and place a star is observed, and it is found that the azimuth is equal to the altitude and the hour angle equal to the declination. Determine its position.

22. Sum the series

$$\frac{1}{1^4 . 3^4} + \frac{1}{3^4 . 5^4} + \frac{1}{5^4 . 7^4} + \text{\&c. } ad.\ inf.$$

23. Find a quadrangle inscribed in a circle, the diameter being an integer, of which the sides, diagonals, and area are all rational.

24. Give the *history* of the parallelogram of forces.

ADJUDGED TO.

FIRST PRIZE.

William Steadman Aldis, B.A., Scholar of Trinity College, Senior Wrangler.

SECOND PRIZE.

John Bond, B.A., Scholar of Magdalene College, Second Wrangler.

SENATE-HOUSE EXAMINATION PAPERS.

EXAMINATION FOR B.A. DEGREE, MAY, 1861.

EXAMINERS:

THOMAS HUGHES EARLE, M.A., *King's College.*
FRANCIS THOMAS HURST, M.A., *St. Catharine's College.*
GEORGE JOHN BOUDIER, M.A., *King's College.*
CHURCHILL BABINOTON, B.D., *St. John's College.*
THOMAS SAMUEL WOOLLASTON, M.A., *St. Peter's College.*
JOHN WILLIS CLARK, M.A., *Trinity College.*

CANDIDATES.

Adams	Christ's	Carpenter	Sidney	Grove	Trin.
Addison	Corpus	Causton	Joh.	Grylls	Joh.
Agassiz	Joh.	Cavill	Jesus	Gurney	Trin.
Alder	Trin. H.	Clarke, R. D.	Caius	Hall	Pet.
Allen	Trin.	Clarke	Emm.	Hankey, S. A.	Trin.
Alleyne	Trin.	Climenson	Trin.	Hargreaves	Trin.
Alston	Joh.	Cogswell	Sidney	Harries	Jesus
Amherst, Hon.	P. Trin.	Collings	Trin.	Harwood	Trin. H.
Anderson	Corpus	Corfield	Trin.	Hawkesworth	Trin.
Apthorp	Emm.	Dashwood	Christ's	Hawkrigg, J.	Clare
Atherton	Joh.	Davey	Queens'	Hayter	Emm.
Atkinson, F. H.	Caius	Davis	Joh.	Heathfield	Trin.
Bagnall	Sidney	Daw	Emm.	Henniker	Trin.
Baillie	Trin.	Dearsly	Caius	Henty	Trin.
Baker	Magd.	De Robeck	Trin.	Hodgson	Pet.
Balls	Pet.	Dickinson	Caius	Hole	Christ's
Bamford	Joh.	Dobson	Trin.	Hopton	Trin.
Baring-Gould	Joh.	Dodington	Trin.	Hose	Joh.
Barnard	Trin.	Duke	Joh.	Hosegood	Sidney
Beavan	Caius	Dunn, W. A.	Corpus	Hudson, F. W.	Trin.
Beavan	Joh.	Dyson	Trin.	Jamieson	Emm.
Becher	Trin.	Elliot	Trin.	Kempson	Emm.
Best	Joh.	Ely	Joh.	Kershaw	Cath.
Beverley	Joh.	Evans	Emm.	Knox, A. B.	Trin.
Bishop	Christ's	Ewen	Trin.	Lewthwaite	Trin.
Blake	Corpus	Fawcett	Trin.	Mabson	Trin.
Blake	Trin.	Fenn	Trin.	Makins	Trin.
Boddington	Pet.	Forster	Trin.	Manners-Sutton	Magd.
Bottom	Emm.	Frost	Trin.	Marsden	Queens'
Bowen	Caius	Gardner	Corpus	Matthews, W. P.	P. Magd.
Bowen	Trin.	Gibbs	Trin.	Mayne	Joh.
Bourke, Hon. H.	L. Trin.	Ginders	Joh.	McLaughlin	Magd.
Bragge	Trin.	Goodchild	Emm.	Meeking	Trin.
Brailsford	Trin. H.	Gorst	Joh.	Melville	Trin.
Brent	Queens'	Gorst	Trin.	Mirehouse, J.	Clare
Brymer	Trin.	Graham	Pet.	Moncrieff	Trin.
Butlin	Corpus	Griffiths	Trin.	Moore	Magd.
Carlyon	Emm.	Grimaldi	Caius	Morton	Trin.

Muriel	Pet.	Rule	Corpus	Thorne	Caius
Newman	Cath.	Sargant	Trin.	Thornhill	Magd.
Newall	Trin.	Savage	Caius	Tilston	Trin. H.
Neame	Clare	Scott	Trin.	Tooth	Trin.
Nott	Trin.	Seaton	Trin.	Trevelyan	Christ's
Onslow	Trin.	Selwyn	Joh.	Valentine	Joh.
Outram	Christ's	Shaw	Caius	Wailes	Caius
Page	Joh.	Shepherd, J. W.	Trin.	Walker	Caius
Palmour	Emm.	Shirley	Trin.	Walker, C.	Trin.
Pardoe, J.	Trin.	Simcox	Joh.	Watkins	Trin.
Perceval	Trin. H.	Skeels	Emm.	Walsh	Joh.
Pidcock	Corpus	Slight	Joh.	Webber	Trin. H.
Pincott	Caius	Smith	Emm.	Wharton	Queens'
Pomeroy	Trin.	Staunton	Joh.	Wilkinson	Corpus
Powell, D.	Trin.	Stevenson	Trin.	Wilkinson	Cath.
Reeve	Christ's	Steward	Joh.	Wilson	Queens'
Roberts	Joh.	Stuart	Caius	Wilson, R. H.	Trin.
Robinson	Jesus	Sturges	Emm.	Wilson, W. D.	Trin.
Rogers	Queens'	Tarleton	Joh.	Wolley	Emm.
Rowlands, J.	Corpus	Tate	Trin.	Yardley	Joh.
Rowlands, L. J	Corpus	Tatham	Trin.	Yeoman	Trin.
Rudge	Corpus	Taylor	Queens'	Young, F. C.	Trin.

EUCLID.

1. Define a straight line, a plane angle, a sector of a circle. When are triangles said to be similar?

2. Draw a straight line perpendicular to a given straight line of unlimited length, from a given point without it.

3. If two triangles have two angles of the one equal to two angles of the other, each to each, and one side equal to one side, namely the sides opposite to the equal angles in each, then the other sides shall be equal each to each.

Shew by means of this proposition that if the angles, which two sides of a triangle produced make with the third side, are equal, the triangle is isosceles.

4. If a straight line fall upon two parallel straight lines, it makes the alternate angles equal to one another.

If through a point, equidistant from two parallel straight lines, two straight lines be drawn cutting the parallel straight lines, they will intercept equal portions of these lines.

5. If a side of any triangle be produced, the exterior angle is equal to the two interior and opposite angles.

The exterior angles of a quadrilateral, made by producing the sides successively in the same direction, are together equal to the interior angles.

6. Triangles upon equal bases and between the same parallels are equal to one another.

If from the opposite angles of a parallelogram straight lines be drawn to a point in the diagonal produced, the triangles, thus formed externally to the parallelogram, are equal.

7. If a straight line be bisected and produced to any point the rectangle contained by the whole line thus produced and the part of it produced, together with the square of half the line bisected, is equal to the square of the straight line which is made up of the half and the part produced.

If a straight line drawn through the center of a circle bisect a

straight line which does not pass through the center it shall cut it at right angles, and conversely, if it cuts it at right angles it shall bisect it.

9. The angles in the same segment of a circle are equal to one another.

If two straight lines whose extremities are in the circumference of a circle cut one another, the triangles formed by joining their extremities are equiangular to each other.

10. If two straight lines cut one another at right angles within a circle the rectangle contained by the segments of one of them is equal to the rectangle contained by the segments of the other.

Hence shew that the angle in a semicircle is a right angle.

11. Inscribe a circle in a given square.

12. If the sides of two triangles, about each of their angles be proportionals, the triangles shall be equiangular; and the equal angles shall be those which are opposite to the homologous sides.

EUCLID.

1. Define a right angle, a plane superficies, and a segment of a circle. When are segments of circles said to be similar?

2. If two triangles have two sides of the one equal to two sides of the other, each to each, and have likewise their bases equal, the angle which is contained by the two sides of the one shall be equal to the angle contained by the two sides equal to them of the other.

3. The greater angle of every triangle is subtended by the greater side or has the greater side opposite to it.

In an obtuse-angled triangle the greatest side is opposite the obtuse angle.

4. If a straight line falling on two other straight lines make the alternate angles equal to each other, these two straight lines shall be parallel.

If two finite straight lines bisect each other the figure formed by joining their extremities is a parallelogram.

5. The three interior angles of a triangle are together equal to two right angles.

Divide a right-angled triangle into two isosceles triangles.

6. If a parallelogram and a triangle be upon the same base and between the same parallels, the parallelogram shall be double of the triangle.

Describe a triangle that shall be equal to a given parallelogram and have one of its angles equal to a given rectilineal angle.

7. If a straight line be divided into any two parts, the squares of the whole line and of one of the parts are equal to twice the rectangle contained by the whole and that part together with the square of the other part.

8. Find the center of a given circle.

Only one circle can be drawn through three given points.

9. In equal circles equal angles stand upon equal circumferences whether they be at the centers or circumferences.

10. If a straight line touches a circle, and from the point of contact a straight line be drawn cutting the circle, the angles, which this line makes with the line touching the circle, shall be equal to the angles which are in the alternate segments of the circle.

The segments into which a circle is cut by any straight line, contain angles whose difference is equal to the inclination to each other of the straight lines touching the circle at the extremities of the straight line which divides the circle.

11. Inscribe a square in a given circle.

12. The sides about the equal angles of equiangular triangles are proportionals and those which are opposite to the equal angles are homologous sides, that is, are the antecedents or consequents of the ratios.

EUCLID.

1. Define a circle and a parallelogram. State the last axiom.

2. If two triangles have two sides of the one equal to two sides of the other, each to each; and have likewise the angles contained by those sides equal to each other; they shall likewise have their bases, or third sides, equal; and the two triangles shall be equal; and their other angles shall be equal, each to each, viz. those to which the equal sides are opposite.

3. If one side of a triangle be produced, the exterior angle is greater than either of the interior opposite angles.

Prove the proposition fully for both the interior angles.

4. Triangles upon equal bases, and between the same parallels, are equal to one another.

The diagonals divide a parallelogram into four equal triangles.

5. If the square described upon one of the sides of a triangle, be equal to the squares described upon the other two sides of it; the angle contained by these two sides is a right angle.

The triangles ABC, DEF, having the angles ACB, DFE right angles, have also the sides AB, AC equal to DE, DF each to each, shew that the triangles are equal in every respect.

6. If a straight line be divided into any two parts, the squares of the whole line, and of one of the parts, are equal to twice the rectangle contained by the whole and that part, together with the square of the other part.

In a triangle, whose vertical angle is a right angle, a straight line is drawn from the vertex perpendicular to the base, shew that the square of either of the sides adjacent to the right angle, is equal to the rectangle contained by the base and the segment of it adjacent to that side.

7. In obtuse-angled triangles, if a perpendicular be drawn from either of the acute angles to the opposite side produced, the square of the side subtending the obtuse angle, is greater than the squares of the sides containing the obtuse angle, by twice the rectangle contained by the side upon which, when produced, the perpendicular falls, and the straight line intercepted without the triangle between the perpendicular and the obtuse angle.

8. Define the angle of a segment, also the sector of a circle.

9. The opposite angles of any quadrilateral figure inscribed in a circle, are together equal to two right angles.

If from O, the center of the circle inscribed in a triangle ABC, OD, OE, OF be drawn perpendicular to the sides BC, AC, AB respectively, and from any point P in OP, drawn parallel to AB, PQ, PR, be drawn perpendicular to OD, OE, respectively or these produced, shew that the triangles ABC, QRO, are equiangular to one another.

10. A segment of a circle being given, describe the circle of which it is the segment.

11. Describe a circle about a given square.

12. If the angle of a triangle be divided into two equal angles, by a straight line which also cuts the base; the segments of the base shall have the same ratio which the other sides of the triangle have to one another; and conversely, if the segments of the base have the same ratio which the other sides of the triangle have to one another, the straight line drawn from the vertex to the point of section, divides the vertical angle into two equal angles.

If two of the exterior angles of a triangle ABC be bisected by the lines COE, BOD intersecting in O, and meeting the opposite sides in the points E and D, prove that $OD : OB :: AD : AB$, and $OC : OE :: AC : AE$.

EUCLID.

1. DEFINE a right angle and a rhombus. Give Euclid's Postulates.

2. If two angles of a triangle be equal to each other, the sides also which subtend, or are opposite to, the equal angles, shall be equal to one another.

In an equiangular triangle the lines drawn to bisect the equal angles will also bisect the opposite sides at right angles.

3. If two straight lines cut one another, the vertical, or opposite angles shall be equal.

In any rectilineal figure, the straight lines bisecting any interior angle, and the corresponding exterior one made by producing an adjacent side, are at right angles to each other.

4. If a straight line fall upon two parallel straight lines, it makes the alternate angles equal to one another; and the exterior angle equal to the interior and opposite upon the same side; and likewise the two interior angles upon the same side together equal to two right angles.

5. Describe a square upon a given straight line.

6. If a straight line be divided into any two parts, the square of the whole line is equal to the squares of the two parts together with twice the rectangle contained by the parts.

In a triangle, whose vertical angle is a right angle, a straight line is drawn from the vertex perpendicular to the base, shew that the rectangle contained by the segments of the base is equal to the square of the perpendicular.

7. Divide a given straight line into two parts, so that the rectangle contained by the whole and one of the parts, shall be equal to the square of the other part.

8. Define the angle in a segment. What are similar segments?

9. The opposite angles of any quadrilateral figure inscribed in a circle, are together equal to two right angles.

If from O, the center of the circle inscribed in a triangle ABC, OD, OE, OF be drawn perpendicular to the sides BC, AC, AB respectively, and from any point P in OP, drawn parallel to AB, perpendiculars PQ, PR be drawn upon OD and OE respectively, or these produced, shew that the triangle QRO is equiangular to the triangle ABC.

10. Upon a given straight line describe a segment of a circle, which shall contain an angle equal to a given rectilineal angle.

11. Inscribe a circle in a given square.

12. The sides about the equal angles of equiangular triangles are proportionals; and those which are opposite to the equal angles are homologous sides, that is, are the antecedents or consequents of the ratios.

Straight lines are drawn through the angular points of a triangle parallel to the opposite sides, and through the angular points of the triangle thus formed straight lines are drawn parallel to its opposite sides, and so on; shew that all these triangles are similar to the original triangle, and any one has its sides bisected by the angular points of the preceding triangle.

EURIPIDIS BACCHÆ.

TRANSLATE the following passages into ENGLISH PROSE:

1. Beginning, λοχίοις δ' αὐτίκα νιν δέξατο θαλάμοις Κρονίδας Ζεύς· κ.τ.λ.
   Ending, Βρόμιος εὖτ' ἂν ἄγῃ θιάσους.—l. 95 to 115.

Write down the Attic form of every word in the above passage which has undergone alteration.

ταυρόκερων: give the nominative and genitive cases.

Give some account of the orgiastic worship of Dionysus (explaining the terms *thyrsus*, *cista*, and *dithyrambus*), and make such remarks as you

deem expedient as to its antiquity and origin. Write a short history of Thebes, from the earliest times down to its destruction by Alexander. Who restored it?

2. Beginning, ὅταν λάβῃ τις τῶν λόγων ἀνὴρ σοφὸς, κ.τ.λ.
Ending, μηρῷ. διδάξω σ' ὡς καλῶς ἔχει τόδε.—l. 266 to 287.

Give the principal tenses of the following verbs: λαμβάνω, δίδωμι, γίγνομαι, ἔρχομαι, εὑρίσκω, τρέφω.

Decline the singular number of οὗτος and ὁ αὐτός. Derive Δημήτηρ, and give some account of her worship in Greece. διδάξω, κ.τ.λ. What explanation is given?

3. Beginning, ΠΕ. πᾶν κρεῖσσον ὥστε μὴ 'γγελᾶν βάκχας ἐμοί, κ.τ.λ.
Ending, δεινότατος, ἀνθρώποισι δ' ἠπιώτατος.—l. 842 to 861.

Decline κρείσσων in the singular. What is the Attic form? Has it a positive and superlative? Under what circumstances do prepositions retract the accent?

γέλωτα ὀφλεῖν, εἰς Ἅιδου: quote corresponding expressions in Latin.

δεινότατος, ἠπιώτατος: what is the rule for forming the superlative in -ότατος and -ώτατος?

How do ἥκω, ἔρχομαι, and εἶμι differ in signification in Attic Greek?

4. Beginning, καὶ τὴν Ἄρεως παῖδ' Ἁρμονίαν, δάμαρτ' ἐμὴν, κ.τ.λ.
Ending, ΚΑ. οὐκ οἶδα, τέκνον· σπικρὸς ἐπίκουρος πατήρ.
l. 1356 to 1366.

Scan the first line: what have you to remark respecting the scansion? How are ποῖ, ποῦ, and πῇ distinguished? Explain any apparent exception. Distinguish ποῦ and που.

EURIPIDIS BACCHÆ.

TRANSLATE the following passages into ENGLISH PROSE:

1. Beginning, Ἀσίας ἀπὸ γαίας, κ.τ.λ.
Ending, Ἑλλάδος εἰς εὐρυχόρους ἀγυιὰς τὸν Βρόμιον.—l. 64 to 87.

Give the Attic form of every word in the above passage which has undergone alteration.

Κυβέλας: what are the different forms of this word? What have you to remark on the quantity of one of the syllables? Give some account of her worship.

εὐρυχόρους: derive this, and investigate the meanings of χόρος. (Donaldson, *New Crat.* § 280.)

ἔκτοπος, κ.τ.λ. Quote similar passages from Greek or Latin authors.

2. Beginning, ΠΕ. ταῦτ' οὐχὶ δεινῆς ἀγχόνες ἔστ' ἄξια, κ.τ.λ.
Ending, Ἐχίονος δ' ὧν παῖς καταισχύνεις γένος.—l. 246 to 265.

πολὺν γέλων. Decline the singular of both words: how is the accusative governed? Give some account of the legendary history of Cadmus; explaining also the parentage of Pentheus. What historical truth seems to underlie the myth of Cadmus? Make any remarks that you deem expedient about the forms of the letters, and the introduction and disuse of certain letters in the Greek alphabet? Derive *alphabet*, explaining the meaning of its roots. Give the principal tenses of the following verbs: ὁράω, ἔχω, ἵημι, γίγνομαι, φέρω, ἄγω.

3. Beginning, ΔΙ. πείθει μὲν οὐδὲν, τῶν ἐμῶν λόγων κλύων, κ.τ.λ.
Ending, ΔΙ. ὦ τᾶν, ἔτ' ἔστιν εὖ καταστῆσαι τάδε.—l. 787 to 802.

What are the significations of οὐ, μὴ, and οὐ μὴ in Attic Greek? Give examples of their use. Decline the singular of οὐδείς: how much of inflection of the word is in use? Illustrate a line in this passage from the New Testament. What tenses of ἵστημι are transitive, and what intransitive?

4. Beginning, ΑΓΑ. τί δ' οὐ καλῶς τῶνδ', ἢ τί λυπηρῶς ἔχει; κ.τ.λ.
Ending, ΑΓΑ. ὡς ἐκλέλησμαί γ' ἃ πάρος εἴπομεν, πάτερ.
l. 1264 to 1273.

What is the force of ἰδού? What variations of accentuation do dissyllabic prepositions admit, and with what exceptions? What does ἂν signify, when joined with an indicative, optative, and subjunctive mood?

EURIPIDIS BACCHÆ.

TRANSLATE:

1. Beginning, ῥιπῶν δὲ Λυδῶν τοὺς πολυχρύσους γύας, κ.τ.λ.
Ending, ζῆν' ἐξεκαυχώνθ', ὅτι γάμους ἐψεύσασο.—l. 13 to 31.

δύσχιμον. Give the derivation; what other reading exists?

μίγασι, κ.τ.λ. Point out an unusual construction in this clause.

σοφίσματα: how is this word governed?

βάκτρια τείχη: what is the modern name of the city, and where is it?

State briefly by what rulers Bactriana was successively governed from the earliest times to the Mahommedan conquest. Investigate the various senses of *Asia* at different times. What is its meaning here? What in the New Testament? What is the date of the expression *Asia Minor?*

2. Beginning, ΚΑ. ὦ παῖ καλῶς σοι Τειρεσίας παρῄνεσεν· κ.τ.λ.
Ending, καὶ στέμματ' ἀνέμοις καὶ θυέλλαισιν μέθες.
l. 330 to 350.

Give the principal tenses of the following verbs: φημί, τίκτω, πάσχω, χέω, ἔρχομαι, δοκέω. What are the significations of οὐ, μή, and οὐ μή in Attic Greek?

Derive and explain ὀργάσιν, τριαίνου. What verbs take two accusatives in Greek? Decline the indicative present of εἰμί, and εἶμι.

3. Beginning, ἴτε θοαὶ λύσσης κύνες ἴτ' εἰς ὄρος, κ.τ.λ.
Ending, γόνου γηγενῆ.—l. 977 to 996.

Write down the Attic form of every word in the above passage which has undergone alteration.

Γοργούων, Ἐχίονος: give some account of each of these. What have you to observe respecting νιν in the above passage? Give the nominative singular of κύνες, and γυναικῶν. What are the three degrees of comparison of πρῶτος? How is πρῶτος itself formed?

4. Beginning, ΑΓΑ. Διόνυσε, λισσόμεσθά σ', ἠδικήκαμεν. κ.τ.λ.
Ending, ΔΙ. τί δῆτα μέλλεθ' ἅπερ ἀναγκαίως ἔχει.—l. 1344 to 1351.

ἤδετε. What have you to observe of this form? Decline οἶδα. Scan the fifth line, and give an instance of a similar peculiarity. In what places do the Tragics admit an anapæst into an iambic line?

EURIPIDIS BACCHÆ.

TRANSLATE the following passages into ENGLISH PROSE:

1. Beginning, τοιγὰρ νιν αὐτὰς ἐκ δόμων ᾤστρησ' ἐγώ, κ.τ.λ.
Ending, ζητῇ, ξυνάψω μαινάσι στρατηλατῶν.—l. 32 to 52.

ἐκμαθεῖν, κ.τ.λ. Explain the construction; and give a Latin example of it. Investigate the senses of μὲν οὖν in Attic Greek. Scan the sixteenth line, and give other Greek examples of a similar peculiarity in the scansion.

Give some account of the legendary history of Cadmus: what do you conceive to be its true historical significance?

2. Beginning, μάντις δ' ὁ δαίμων ὅδε· τὸ γὰρ βακχεύσιμον, κ.τ.λ.
Ending, καὶ σπένδε καὶ βάκχευε καὶ στέφου κάρα.—l. 298 to 313.

What is the double signification of adjectives in -ιμος? What is the corresponding Latin termination? What cases do verbs of sense govern

in Greek? What are the constructions of ἀκούω? Give the principal tenses of the following verbs: ἔχω, ἔρχομαι, ὁράω, βάλλω, τίθημι, σπένδω. Decline the singular number of μέγας and πολύς. Give a detailed account of the inflection of κάρα.

3. Beginning, ἆρ' ἐν παννυχίοις χοροῖς, κ.τ.λ.
Ending, ὅ τι καλὸν φίλον ἀεί.—l. 862 to 881.

Write down the Attic form of every word in the above passage which has undergone alteration.

What does ἂν signify when joined with an indicative, subjunctive, and optative mood? Decline the plural number of κρείσσων. From what root is it derived? What is the superlative?

4. Beginning, ΚΑ. ἐύστην' ἀληθεῖ, ὡς ἐν οὐ καιρῷ πάρει. κ.τ.λ.
Ending, ΚΑ. ὕβριν γ' ὑβρισθείς. θεὸν γὰρ οὐχ ἡγεῖσθέ νιν.
l. 1288 to 1298.

κατέκτας. What part of the verb is this?

Distinguish between ἡγεῖσθαι θεούς, and νομίζειν θεούς. Where is the scene of the Bacchæ laid? Where does it appear to have been written? Why do you think so? Distinguish ἡ, ἢ, ἦ, ἦ, ἦ, ἦ.

MECHANICS AND HYDROSTATICS.

1. Shew that forces may be properly represented by straight lines.

2. If two weights, acting perpendicularly on a straight lever, on opposite sides of the fulcrum, balance each other, they are inversely as their distances from the fulcrum.

If the pressure on the fulcrum be equivalent to a weight of 15 lbs., and the difference of the magnitudes of the forces to a weight of 3 lbs., find the forces, and the ratio of the arms at which they act.

3. If the adjacent sides of a parallelogram represent two forces acting at a point in direction and magnitude, the diagonal will represent the resultant force in direction.

At what angle must two forces P and $2P$ act upon a point that the direction of their resultant may be at right angles to the direction of one of the forces?

4. Find the condition of equilibrium when a weight W is supported on an inclined plane by a force P acting parallel to the plane.

If the force acts horizontally there is equilibrium when P is to W as the height of the plane is to its base.

5. Find the center of gravity of three heavy points, and shew that the pressure on the center of gravity is equal to the sum of the weights in all positions.

6. When a body is placed on a horizontal plane it will stand or fall according as the vertical line drawn from its center of gravity falls within or without the base.

A board in the shape of a right-angled triangle is placed in a vertical plane with its right angle resting on a rough horizontal floor and one of its acute angles leaning against a vertical wall perpendicular to the plane of the board; find its position when the pressure on the wall is the least possible.

7. If a body float in a fluid, it displaces as much of the fluid as is equal in weight to the weight of the body.

Why can a man swim on his back more easily than in any other position?

8. Define Specific Gravity. What is meant when the Specific Gravity of a substance is said to be ·00125?

The specific gravity of sea water being 1·027, what proportion of fresh

water must be added to a quantity of sea water that the specific gravity of the compound may be 1·009?

9. When a body of uniform density floats on a fluid, the part immersed is to the whole body as the Specific Gravity of the body is to the specific gravity of the fluid.

A solid sphere floats in a fluid with three-fourths of its bulk above the surface: when another sphere half as large again is attached to the first by a string, the two spheres float at rest below the surface of the fluid; shew that the Specific Gravity of one sphere is 6 times greater than that of the other.

10. Describe the construction of the Forcing pump and its operation.

What will be the effect of making a small aperture in the barrel? If the piston works uniformly up and down the length of the barrel and a small aperture be made one-third of the way up the barrel, how much more time than before will be consumed in filling a tank?

11. Describe the method of filling and graduating a common Thermometer.

Shew how to graduate a Thermometer on whose scale 20° shall denote the freezing point and whose 80th degree shall indicate the same temperature as 80° Fahrenheit.

MECHANICS AND HYDROSTATICS.

1. Define Gravity and Weight. How is Statical Force measured?

2. If two forces, acting perpendicularly on a straight lever in opposite directions and on the same side of the fulcrum, balance each other, they are inversely as their distances from the fulcrum.

If the pressure on the fulcrum be equivalent to a weight of 3 lbs. and the sum of the magnitude of the forces to a weight of 15 lbs., find the forces and the ratio of the arms at which they act.

3. If three forces represented in magnitude and direction by the three sides of a triangle, when taken in order, act upon a point, they will keep it at rest.

Two strings are respectively fastened by their upper extremities to two points A and B in the same horizontal line; the string at A carries a weight W at its lower extremity which is passed through a ring attached to the lower extremity of the string at B; if the distance between the points A and B is so adjusted that the strings rest at equal inclinations to the horizon, the tension of the string at B is equal to the weight W.

4. Find the condition of equilibrium on the wheel and axle. Why is the labour of drawing a bucket of water out of a common well generally greater during the last part of the process than during the first?

5. Find the center of gravity of two heavy points, and shew that the pressure at the center of gravity is equal to the sum of the weights in all positions.

6. When a body is suspended from a point it will rest with its center of gravity in the vertical line passing through the point of suspension.

Two weights W and $2W$ are connected by a rigid weightless rod and also by a loose string which is slung over a smooth peg: compare the lengths of the string on each side of the peg when the weights have assumed their position of equilibrium.

7. The surface of every fluid at rest is horizontal.

Shew how the inclination of a table to the horizon may be estimated by means of a tube bent into the form of the arc of a circle and very nearly filled with fluid.

8. Explain fully the meaning of the equation, 'the weight of a body = its magnitude × its Specific Gravity.'

If 2 cubic feet of a substance weighs 100 lbs., what is its Specific Gravity?

9. When a body is immersed in a fluid the weight lost is to the whole weight as the specific gravity of the fluid is to the specific gravity of the body.

The cavity in a conical rifle bullet is usually filled with a plug of some light wood. If the bullet be held in the hand beneath the surface of water and the plug then removed, will the apparent weight of the bullet be increased or diminished?

10. Describe the construction of the condenser and its operation.

If the direction in which the valves open were reversed, into what instrument would the condenser be converted? Describe the effect of making a small aperture in the barrel.

11. Explain the construction of the common barometer.

Will the actual rise or fall of the mercury in the tube, observed by means of fixed graduations, accurately measure the increase or decrease of the pressure of the atmosphere?

MECHANICS AND HYDROSTATICS.

1. Define force and explain how forces are measured. Shew that they may properly be represented by straight lines.

Construct a triangle, whose sides will represent the forces $2\cdot\dot{1}4285\dot{7}$ lbs. $2\cdot0\dot{0}\dot{9}$ lbs., and $2\cdot00\dot{9}$ lbs.

2. If two weights acting perpendicularly on a straight lever on opposite sides of the fulcrum balance each other, they are inversely as their distances from the fulcrum; and the pressure on the fulcrum is equal to their sum.

A heavy pole, weighing 12 lbs., whose center of gravity falls at a distance of one-third of the pole from one end, is carried horizontally by two men, one at each end, find the weight supported by each man.

3. If three forces, represented in magnitude and direction by the sides of a triangle, act on a point, they will keep it at rest.

ABCD is a quadrilateral inscribed in a circle; forces *P*, *Q*, *R*, acting in directions *AB*, *AD*, *CA* would keep a particle at rest, shew that $P : Q :: CD : BC$.

4. In a system in which each pulley hangs by a separate string, and the strings are parallel, there is a equilibrium when $p : w :: 1$: that power of 2 whose index is the number of moveable pulleys.

How may a boy, who can only lift 16 stone, be enabled to raise 1024 stone?

5. Define velocity.

If p and w balance each other in the system of pulleys, in which the same string passes round all the pulleys, and the whole be put in motion, shew that $p : w ::$ w's velocity in direction of gravity : p's velocity.

6. When a body is placed on a horizontal plane, it will stand or fall, according as the vertical line, drawn from its center of gravity, falls within or without its base. With what restriction is this true of any plane?

A sugarloaf stands on an inclined plane, rough enough to prevent sliding, whose inclination to the horizon is 45°, shew that it will fall over, if the height of the sugarloaf be more than twice as great as the diameter of its base. The center of gravity of a cone being distant from the base one-fourth of the height.

7. How is the pressure at a point in a fluid estimated? Explain the Hydrostatic paradox.

If the area of the larger surface be diminished, the other circumstances of the explanation remaining the same, what would be the effect?

8. Define specific gravity and explain how it is measured.

Explain how to find the weight of a body whose specific gravity is known. Find the weight of 36 cubic inches of cork whose specific gravity is ·24.

9. When a body of uniform density floats on a fluid, the part immersed : the whole body :: the specific gravity of the fluid : the specific gravity of the body.

A body, whose weight is 6lbs., weighs 3lbs. and 4lbs. respectively in two different fluids, compare the specific gravities of the fluids.

10. Describe the construction of the common pump and its operation. What limits the height to which water can be raised by a common pump? How is this obviated by a forcing or lifting pump?

11. Shew how to graduate a common thermometer.

One thermometer marks two temperatures by 9° and 10°, another thermometer by 12° and 14°, what will the latter mark, when the former marks 15°?

MECHANICS AND HYDROSTATICS.

1. Define force; how are forces measured? Shew that they may properly be represented by straight lines.

Construct a triangle whose sides will represent the forces $3\cdot\dot{0}7692\dot{3}$ lbs. $3\cdot4\dot{1}6$lbs. and $3\cdot1\dot{2}\dot{7}$ lbs. respectively.

2. If two forces acting perpendicularly on a straight lever on opposite directions and on the same side of the fulcrum balance each other, they are inversely as their distances from the fulcrum; and the pressure on the fulcrum is equal to the difference of the forces.

A heavy pole, weighing 12lbs., whose center of gravity falls at a distance of one-fourth of the pole from one end, is fastened at this end by a rope to the ceiling, and the other end is raised by a man so that the pole is horizontal, what weight will the man support?

3. If three forces, represented in magnitude and direction by the sides of a triangle, act on a point, they will keep it at rest.

ABCD is a quadrilateral inscribed in a circle, forces *P*, *Q*, *R* act in directions *AB*, *AD*, *CA*, so that $P : Q : R :: CD : BC : BD$, shew that *P*, *Q*, *R* form a system in equilibrium.

4. In a system of pulleys, in which the same string passes round any number of pulleys and the parts of it between the pulleys are parallel, there is an equilibrium when $p : w :: 1$: the number of strings at the lower block.

How may a boy, who can only lift 15 stone, be enabled to raise 90 stone?

5. Define velocity.

If p and w balance in the system of pulleys, in which each pulley hangs by a separate string and the whole be put in motion, shew that $p : w :: w$'s velocity in direction of gravity : p'a velocity.

6. When a body is placed on a horizontal plane, it will stand or fall, according as the vertical line, drawn from its center of gravity, falls within or without its base. With what restriction is this true of any plane?

A sugarloaf, whose height is twice as great as the diameter of its base, stands on a table, rough enough to prevent sliding, one end of which is gently raised until the sugarloaf is on the verge of falling over, when this

is the case, find the inclination of the table to the horizon. The center of gravity of a cone being distant from the base one-fourth of the height.

7. How is pressure at a point in a fluid estimated? Shew that the surface of every fluid at rest is horizontal.

In supplying a town with water, why is the locality of the reservoir selected in the highest position possible?

8. If a body floats on a fluid, it displaces as much of the fluid as is equal in weight to the weight of the body; and it presses downwards and is pressed upwards with a force equal to the weight of the fluid displaced.

A symmetrical box, weighing 8 lbs., with a weight on the top, floats just immersed in a fluid: how heavy must the weight be, in order that, when removed, the box may float with only one-third immersed?

9. Define specific gravity and explain how it is measured. Shew how to find the weight of a body whose specific gravity is known.

Find the weight of 54 cubic inches of copper, whose specific gravity is 8·8.

10. Describe the construction of the common air-pump and its operation. What advantage does Hawksbee's possess over the common air-pump?

11. Shew how to graduate a common thermometer.

One thermometer marks two temperatures by 8° and 10°, another thermometer by 11° and 14°, what will the latter mark, when the former marks 16°?

ACTS OF THE APOSTLES.

TRANSLATE:

1. Beginning, Ἄνδρες Γαλιλαῖοι, κ.τ.λ.
   Ending, σαββάτου ἔχον ὁδόν.—chap. i. 11, 12.

Parse ἀναληφθεὶς, ἐλεύσεται.

Parse and explain the word ἐλαιῶνος. What place does St. Luke mention in his Gospel as the locality of the Ascension? How do you reconcile the two statements? What was the length of a Sabbath-day's journey?

2. Beginning, Ἦσαν δὲ προσκαρτεροῦντες τῇ διδαχῇ τῶν ἀποστόλων, κ.τ.λ.
   Ending, καθ' ἡμέραν τῇ ἐκκλησίᾳ.—chap. ii. 42—47.

What different explanations have been given to the words κλάσις τοῦ ἄρτου?

What is specially meant by ταῖς προσευχαῖς?

What is the difference between κτήματα and ὑπάρξεις?

Give the derivation of ἀφελότητι.

3. Beginning, Ἐν δὲ ταῖς ἡμέραις ταύταις πληθυνόντων τῶν μαθητῶν, κ.τ.λ.
   Ending, καὶ τῇ διακονίᾳ τοῦ λόγου προσκαρτερήσομεν.
   chap. vi. 1—4.

Parse προσκαλεσάμενοι, καταλείψαντας, ἐπισκέψασθε.

What was the difference between the Ἑλληνισταὶ and the Ἑβραῖοι?

What is meant by the words διακονεῖν τραπέζαις?

4. Beginning, Ὁ δὲ Σαῦλος ἔτι ἐμπνέων ἀπειλῆς καὶ φόνου εἰς τοὺς μαθητὰς τοῦ Κυρίου, κ.τ.λ.
   Ending, καὶ λαληθήσεταί σοι τί σε δεῖ ποιεῖν.—chap. ix. 1—6.

When is Damascus first mentioned in the Bible? Does St. Paul on any subsequent occasion relate these events differently? What is known of him previous to his conversion?

5. Beginning, Ἐξιόντων δὲ ἐκ τῆς συναγωγῆς τῶν Ἰουδαίων, κ.τ.λ.
   Ending, ἰδοὺ στρεφόμεθα εἰς τὰ ἔθνη.—chap. xiii. 42—46.

At what place did this occur? Draw a map marking the places visited by St. Paul in his *first* journey. Who are the προσήλυτοι? In what words did our Lord command His Apostles to preach the Gospel especially to the Jews?

6. Beginning, Ἡμέρας δὲ γενομένης, κ.τ.λ.
Ending, ὅτι Ῥωμαῖοί εἰσι.—chap. xvi. 35—38.

Parse ἀπέσταλκον—ἀπολυθῆτε—ἐξαγαγέτωσαν.

Derive and explain ῥαβδούχος. How did St. Paul come to be born a Roman citizen? On what other occasion did this privilege save him?

What is the exact meaning of νεωκόρον? How long had St. Paul been at Ephesus?

7. Beginning, Ὁ δὲ, Οὐ μαίνομαι, κ.τ.λ.
Ending, Ἐν ὀλίγῳ με πείθεις Χριστιανὸν γενέσθαι.
chap. xxvi. 25—28.

Is our Version correct in its rendering of the last words? What is the accurate meaning of ἐν ὀλίγῳ?

8. Beginning, Ἀνενθέτου δὲ τοῦ λιμένος ὑπάρχοντος πρὸς παραχειμασίαν, κ.τ.λ.
Ending, χαλάσαντες τὸ σκεῦος, οὕτως ἐφέροντο.—chap. xxvii. 12—17.

Explain accurately κατὰ Λίβα καὶ κατὰ χῶρον. What wind is εὐροκλύδων? Does our version translate χαλάσαντες τό σκεῦος rightly? Explain the manœuvre.

9. "Of the Jews five times received I forty stripes save one. Thrice was I beaten with rods, once was I stoned, thrice I suffered shipwreck, a night and a day I have been in the deep."—2 Cor. xi. 24, 25.

Shew that though many of the facts here alluded to are not mentioned in the Acts, their omission does not make the narrative less trustworthy.

ACTS OF THE APOSTLES.

TRANSLATE:

1. Beginning, Καὶ ἐν τῷ συμπληροῦσθαι τὴν ἡμέραν τῆς Πεντηκοστῆς, κ.τ.λ.
Ending, καθὼς τὸ πνεῦμα ἐδίδου αὐτοῖς ἀποφθέγγεσθαι.
chap. ii. 1—4.

τὴν ἡμέραν τῆς Πεντηκοστῆς. When did this festival take place? By what name is it known in the Old Testament?

διαμεριζόμεναι. What meanings have been assigned to this word? What is the nominative to ἐκάθισεν?

2. Beginning, Διὰ δὲ τῶν χειρῶν τῶν ἀποστόλων, κ.τ.λ.
Ending, κἂν ἡ σκιὰ ἐπισκιάσῃ τινὶ αὐτῶν.—chap. v. 12—15.

Parse προσετίθεντο, ἐπισκιάσῃ.

Who are meant by ἅπαντες? Where was the στοὰ Σολομῶνος, and why was it so called?

3. Beginning, Ἔστρεψε δὲ ὁ Θεὸς, κ.τ.λ.
Ending, καὶ μετοικιῶ ὑμᾶς ἐπέκεινα Βαβυλῶνος.—chap. vii. 42, 43.

Parse γέγραπται, προσηνέγκατε.

What is meant by ἐν βίβλῳ τῶν προφητῶν? From whom is the quotation taken? What is known of the worship of Moloch and Remphan?

4. Beginning, Ἀνὴρ δέ τις ἦν ἐν Καισαρείᾳ ὀνόματι Κορνήλιος, κ.τ.λ.
Ending, ἀπέστειλεν αὐτοὺς εἰς τὴν Ἰόππην.—chap. x. 1—8.

Where was the Cæsarea mentioned in this passage? Is there any other town of the same name in Syria? What is the Latin word rendered σπείρα in Greek? Give the modern name of Joppa.

5. Beginning, Καί τις ἀνὴρ ἐν Λύστροις ἀδύνατος τοῖς ποσὶν ἐκάθητο, κ.τ.λ.
Ending, σὺν τοῖς ὄχλοις ἠθελε θύειν.—chap. xiv. 8—13.

Parse ἤλατο, ἐπῆραν, ἐνέγκας.

In what journey of St. Paul's did this happen? Why should the men of Lystra fix upon Jupiter and Mercury in preference to other deities?

6. Beginning, Διελθόντες δὲ τὴν Φρυγίαν καὶ τὴν Γαλατικὴν χώραν, κ.τ.λ.
Ending, ἥτις ἐστὶ πρώτη τῆς μερίδος τῆς Μακεδονίας πόλις καλωνία.
chap. xvi. 6—12.

Draw a map marking the places mentioned in these verses: and give an account of St. Paul's *second* journey. What are we to infer from the use of the first person in the verba ἐζητήσαμεν, εὐθυδρομήσαμεν, etc.? What is the meaning of καλωνία, and what privileges did this title confer on a city?

7. Beginning, Μετὰ δὲ ἡμέρας τινὰς παραγενόμενος, κ.τ.λ.
Ending, καιρὸν δὲ μεταλαβὼν μετακαλέσομαί σε.—chap. xxiv. 24, 25.

Relate the circumstances which caused St. Paul to be brought before Felix. What heathen author gives us a character of Felix? does it agree with what we read of him in the Acts? What office did he hold in Judæa?

8. Beginning, Ὡς δὲ τεσσαρεσκαιδεκάτη νὺξ ἐγένετο, κ.τ.λ.
Ending, ηὔχοντο ἡμέραν γενέσθαι.—chap. xxvii. 27—29.

What part of the Mediterranean is signified by Adria?

9. In 1 Cor. xv. 32, St. Paul speaks of having "fought after the manner of men with beasts at Ephesus." What explanations have been given of these words, and to what event recorded in the Acts do they probably allude?

ACTS OF THE APOSTLES.

TRANSLATE:

1. Beginning, Ἄνδρες ἀδελφοί, κ.τ.λ.
Ending, τουτέστι χωρίον αἵματος.—chap. i. 16—19.

Parse πληρωθῆναι, ἐξεχύθη, ἔλαχεν.

What is the account given by St. Matthew of the death of Judas? How is it reconciled with this?

2. Beginning, Ἀναστὰς δὲ τις ἐν τῷ συνεδρίῳ Φαρισαῖος, κ.τ.λ.
Ending, διελύθησαν καὶ ἐγένοντο εἰς οὐδέν.—chap. v. 34—36.

Parse ἀναστάς, ἀνῃρέθη, ἀπώλετο, διεσκορπίσθησαν.

What is the chronological difficulty respecting the mention of Theudas in this passage?

τῆς ἀπογραφῆς. How does St. Luke speak of this in his Gospel?

3. Beginning, Ἀκούσαντες δὲ οἱ ἐν Ἱεροσολύμοις ἀπόστολοι, κ.τ.λ.
Ending, λαμβάνῃ πνεῦμα ἅγιον.—chap. viii. 14—19.

Where was Samaria situated? By whom was the city founded? Who were the inhabitants in our Saviour's time?

What prophecy of our Saviour's was fulfilled by St. Peter's prominence on this and other occasions in the Acts?

Is anything more known of Simon Magus, by history or by tradition?

4. Beginning, Ἀρξάμενος δὲ ὁ Πέτρος ἐξετίθετο αὐτοῖς καθεξῆς, κ.τ.λ.
Ending, ἀπεσταλμένοι ἀπὸ Καισαρείας πρός με.—chap. xi. 4—11.

Before whom was St. Peter speaking? What meanings have been given to the words τέσσαρσιν ἀρχαῖς? By whom were the messengers sent to St. Peter, and why?

5. Beginning, Διελθόντες δὲ τὴν νῆσον ἄχρι Πάφου, κ.τ.λ.
Ending, καὶ περιάγων ἐζήτει χειραγωγούς.—chap. xiii. 6—11.

ἀνθυπάτῳ. What is the Latin word thus translated? What does it denote respecting the government of the province in question?

Draw a map, marking the places visited by St. Paul in his *first* journey. What name was given to Barnabas?

6. Beginning, Τότε ὁ Παῦλος πρὸς αὐτὸν εἶπε, κ.τ.λ.
Ending, Ἄρχοντα τοῦ λαοῦ σου οὐκ ἐρεῖς κακῶς.—chap. xxiii. 3—5.

κεκονιαμένε. Quote any similar language of our Lord's.

οὐκ ᾔδειν, etc. What different interpretations have been given to these words?

7. Beginning, Ὡς δὲ ἐκρίθη τοῦ ἀποπλεῖν ἡμας εἰς τὴν Ἰταλίαν, κ.τ.λ.
Ending, διὰ τὸ τοὺς ἀνέμους εἶναι ἐναντίους.—chap. xxvii. 1—4.

σπείρης Σεβαστῆς. What is meant by this? What is the Latin word here rendered *σπείρα*?

Explain *ὑπεπλεύσαμεν τὴν Κύπρον*. From what quarter would the wind be blowing so as to be contrary?

8. Beginning, Καὶ διασωθέντες, κ.τ.λ.
Ending, ἔπαθεν οὐδὲν κακόν.—chap. xxviii. 1—5.

What islands have been fixed upon as the one here mentioned? which do you prefer?

9. St. Paul says in his First Epistle to the Corinthians, "Even unto this present hour we labour working with our own hands." Shew from the Acts that he had done so while residing at Corinth.

ACTS OF THE APOSTLES.

TRANSLATE:

1. Beginning, Σταθεὶς δὲ Πέτρος σὺν τοῖς ἕνδεκα, κ.τ.λ.
Ending, αἷμα καὶ πῦρ καὶ ἀτμίδα καπνοῦ·—chap. ii. 14—19.

Parse *σταθείς, ἀπεφθέγξατο, ὄψονται*.

ὥρα τρίτη. What o'clock was this? How was it observed in the Jewish ceremonial Law?

What is the difference between *τέρας, σημεῖον* and *δύναμις*?

2. Beginning, Λαλούντων δὲ αὐτῶν πρὸς τὸν λαὸν, κ.τ.λ.
Ending, ἦν γὰρ ἑσπέρα ἤδη.—chap. iv. 1—3.

What were the duties of the officer called *στρατηγὸς τοῦ ἱεροῦ*?

3. Beginning, Ἀποστείλας δὲ Ἰωσὴφ, κ.τ.λ.
Ending, εἰς τὸ μὴ ζωογονεῖσθαι.—chap. vii. 14—19.

Parse *μετεκαλέσατο, μετετέθησαν, ᾤδει*. Does the statement *ὠνήσατο Ἀβραὰμ παρὰ τῶν υἱῶν Ἐμμὼρ* exactly agree with what is recorded in the Old Testament respecting this purchase?

4. Beginning, Αἱ μὲν οὖν ἐκκλησίαι καθ' ὅλης τῆς Ἰουδαίας, κ.τ.λ.
Ending, καὶ ἐλεημοσυνῶν ὧν ἐποίει.—chap. ix. 31—36.

Parse *παραλελυμένος, στρῶσον*.

Who are meant by *τοὺς ἁγίους* here and elsewhere in the Acts?

What is the situation of Lydda, Saron and Joppa? Give the modern name of the last.

5. Beginning, Κατ' ἐκεῖνον δὲ τὸν καιρὸν ἐπέβαλεν, κ.τ.λ.
Ending, ἀναγαγεῖν αὐτὸν τῷ λαῷ.—chap. xii. 1—4.

What is known of James from the Gospels? What prophecy of our Lord's was fulfilled by his death?

How long did *αἱ ἡμέραι τῶν ἀζύμων* last?

6. Beginning, Γαλλίωνος δὲ ἀνθυπατεύοντος τῆς Ἀχαΐας, κ.τ.λ.
Ending, κριτὴς γὰρ ἐγὼ τούτων οὐ βούλομαι εἶναι.
chap. xviii. 12—15.

Where did this happen? To what celebrated Roman was Gallio related? Describe St. Paul's route since his last departure from Jerusalem.

7. Beginning, Ἡμεῖς δὲ προελθόντες ἐπὶ τὸ πλοῖον, κ.τ.λ.
Ending, γενέσθαι εἰς Ἱεροσόλυμα.—chap. xx. 13—16.

What is to be implied from the use of the personal pronoun *ἡμεῖς*?

Draw a map marking the position of these places, and St. Paul's route thence to Jerusalem.

8. Beginning, Ἐν ἱκαναῖς δὲ ἡμέραις βραδυπλοοῦντες, κ.τ.λ.
Ending, μέλλειν ἔσεσθαι τὸν πλοῦν.—chap. xxvii. 7—10.

What had been the ship's course since leaving Cæsarea?

Explain τὴν νηστείαν.

9. St. Paul, in his Epistle to the Galatians, says that after his persecution of the Church and subsequent conversion, he went into Arabia, returned to Damascus, went after three years to Jerusalem, and then fourteen years after went up again to Jerusalem with Barnabas. Shew that this account agrees with the narrative in the Acts.

CICERO'S SECOND PHILIPPIC.

1. (1) WHAT were the two principal forms of the Roman government previous to the death of Julius Cæsar? What form succeeded that event? Give the dates of their establishment and extinction respectively.

(2) Mention the most important events, political and military, in the life of Cicero.

Translate:

2. Beginning, Poteras autem eo tempore auguratum petere, etc.
Ending, non interfectum a te quam miserum te id impune facere potuisse.—cap. 3.

(*a*) Explain ferre tribum, auguratum petere.

(*b*) Parse confiteri, petere, solebas, occiderea, detulerat, jussissea, interfectum.

3. Beginning, Quæ sententia si valuisset, etc.
Ending, cujus me amicum, te sectorem esse fateare?—cap. 15.

(1) How do you render the words "vitæ consulebam"? how "senatum illum consulebam?" Decline uterque, civis, melior.

(2) Explain "Pharsalia fuga;" did Cicero take part in it?

(3) What siege preceded the battle of Pharsalus? by whom was it undertaken, and with what success?

4. Beginning, Quid cupide a senatu, etc.
Ending, contra patriam arma capiendi.—cap. 21, 22.

What was the "intercessio"? Explain addicta.

5. Beginning, Quum inde Romam proficiscens ad Aquinum accederet, etc.
Ending, non modo illorum cliens esse.—cap. 41.

6. Give some account of the persons and places mentioned in the passage above.

Translate:

Beginning, Defendi rempublicam adolescens, etc.

Ending, quanto verius nunc negabo seni!—cap. 46.

Who was Catiline? Give the date and circumstances of the death of Cicero.

Translate:

Beginning, Qui vero inde reditus Romam! etc.

Ending, sed absconditi nec ita multi.—cap. 42.

Explain briefly the historical allusions.

CICERO'S SECOND PHILIPPIC.

1. (1) STATE, in the order of their tenure, the principal offices of state held respectively by J. Cæsar, M. Antony, and Cicero.

(2) To what king of Rome is ascribed the giving of the earliest Constitution to the Roman people? Mention its leading principles.

(3) How many "orationes Philippicæ" are extant? Can the Second strictly be called an "oratio"? against whom is it directed? what gave rise to it? into what two parts do you divide it?

Translate:

2. Beginning, Quam multa joca solent esse in epistolis, etc.
   Ending, sed etiam amentiæ.—cap. 4.

Derive the words sicarios, chirographo, quæstuosam. Parse prolata, videris, defensurus, negarit. Give the perfect tense of opponas, proferam, progredi, stent.

3. Beginning, Tu vero ascribe me talem in numerum, etc.
   Ending, vectigalium flagitiosissimæ nundinæ.—cap. 13, 14.

(*a*) What is the difference of signification between vereor *ne* faciam and vereor *ut* faciam?

(*b*) Who is meant by regem? what by regnum? Explain "totam fabulam confecissem."

Give the situation and modern name of Narbo.

(*c*) Derive and explain "immunitatum," "nundinæ," "pecuniam."

4. Beginning, Proficiscitur in Hispaniam Cæsar, etc.
   Ending, quem? te, sectorem.—cap. 29, 30.

(1) Ter depugnavit &c. Mention the distinct occasions; and give the geographical position of Thessalia, Hispania. What part of Africa is alluded to?

(2) Give a short account of Dolabella.

(3) "Tam bonus gladiator rudem tam cito." Explain and supply the ellipse. What is the force of the preposition in depugnavit. Explain the word "sector."

5. Beginning, O præclaram illam percursationem tuam mense Aprili atque Maio, etc.
   Ending, Sed ad iter Italiamque redeamus.—cap. 39.

6. Beginning, Quod si se ipsos illi nostri liberatores, etc.
   Ending, propter suspicionem regni appetendi sunt necati.—cap. 44.

Give some account of the persons here mentioned, and of the times in which they lived.

CICERO'S SECOND PHILIPPIC.

1. Give a sketch of the life of M. Antonius.

(1) Under whose auspices did he commence his social life, under whose his political?

(2) Trace his military career, mentioning in their order, with dates, the different countries into which it led him. Where and under what leader did he first distinguish himself?

(3) Starting from what point and before what place did Antony come to the rescue of Cæsar at a critical moment during his war with Pompey? Is there any fact to account for his early enmity against Cicero?

Translate:

2. Beginning, At etiam quodam loco facetus esse voluisti. etc.
   Ending, majora videamus.—cap. 8.

3. Beginning, Sed nihil de Cæsare: etc.
   Ending, Omnia perfecit, quæ senatus salva re publica ne fieri possent perfecerat.—cap. 22.

(1) Give the exact meaning of valetudo, desideratis.

(2) What do you remark upon the words cladem illam fugamque?

(3) Give an account of the offices of consul, prætor, quæstor, tribunus plebis.

4. Beginning, Sed omitto ea peccata, etc.
   Ending, pro hortis, pro sectione debebas.—cap. 28, 29.

(1) Parse the words redeo, susceptum, defuisti, gustaras, effugerant, gestis, sequerere.

(2) Explain the words antesignanus, sectione, appellatus.

(3) Give the names of the generals commanding on either side at Pharsalus, Thapsus, Munda, Actium, with the dates of the several battles, and their geographical sites.

5. Beginning, Diadema ostendis. Gemitus toto foro. etc.
Ending, cum omnes fateantur jure interfectum esse qui abjecerit? cap. 34.

6. Derive and explain the following words occurring in the second Philippic:—disciplina, beneficium, injuria, crimen, sestertia, sestertii, dicax.

What is the difference between pudor and pudicitia, joci and joca, nefas and scelus, accido and contingo?

CICERO'S SECOND PHILIPPIC.

1. Give an account of the life of Cneius Pompeius. Mention in order, with dates, the great wars in which he was engaged, and the countries in which they took place. What great party in the state did he represent? What great leader in early life did he follow? What were the immediate causes which led to the civil war between Pompey and Cæsar? What side did Cicero take? When, where, and after what great battle did Pompey die? What was the Lex Pompeia "de ambitu"?

Translate:

2. Beginning, Ad sepulturam corpus vitrici sui negat a me datum. etc.
Ending, apud quos dicit, vituperari.—cap. 7, 8.

(*a*) "vitrici sui." Who was this? how did he meet with his death? had Cicero any hand in it?

(*b*) Who were Pub. Clodius and P. Lentulus?

(*c*) Parse the words redigere, verebare, evadere, adjectum, cohærentes, accessisset.

3. Beginning, Me nemo nisi amicus fecit heredem, etc.
Ending, tu cursim dicis aliena.—cap. 16, 17.

Explain or derive mancipio, tribus, pecunias, designatus. Give the exact English expression answering to the last word.

What kind of verb is factitarat?

4. Beginning, Qui vero Narbone reditus? etc.
Ending, Janitor: Quis tu? A Marco tabellarius.—cap. 30, 31.

What day answers in our Calendar to "ante Kalendas"? Point out the difference between peteres and roges. What technical sense has the word "petitio"?

5. Beginning, Mira verborum complexio! etc.
Ending, qui auctorem odimus, acta defendimus.—cap. 37.

Give the derivation of syngrapha, reciperaret.

6. (1) Translate:

Deduxisti coloniam, Casilinum, quæ Cæsar ante deduxerat. Consuluisti me per literas de Capua idem.

What is the charge against Antony?

State the Roman law with regard to the different kinds of colonies.

(2) Describe the position and modern names of the following places, and mention any historical events connected with them:—Brundisium, Misenum, Capua, Casilinum.

HISTORY OF THE REFORMATION.

1. MENTION some particulars of ritual and other observances peculiar to the ancient British Church as distinguished from the other branches of the Western Church. What inference has been drawn from hence as to the quarter from whence it received Christianity? Which among the early heresies obtained extensive influence in Britain? Name any remarkable foreign divines who took part in the controversy, and give some account of their proceedings.

2. What points of dispute arose on the subject of the Eucharist in the ninth century? State the opinions maintained by the principal writers on either side of the question, and give some instances of the influence exercised by their writings at the period of the Reformation.

3. Define what is meant by the phrase 'benefit of clergy.' Mention some occasion on which it became matter of dispute. When did it obtain legal recognition, and when was it finally abrogated?

4. Under what enactment did Bishop Fisher and Sir Thomas More suffer? Write a short life of the former.

5. Give some account of the opinions of Wycliffe. Name the most remarkable of those who suffered for holding similar tenets within the few years following his death.

6. At what time did the Council of Trent commence its sittings, and when were they brought to a close? Mention the principal subjects which engaged the attention of the Council, and on which a decision was arrived at. In what respects as to its constitution, and the authority by which it was convened did it differ from the Councils which are called Œcumenical?

7. At what time was the sentence of excommunication of Henry VIII. pronounced; and what interval elapsed before its publication? Relate briefly the more prominent events in England affecting the advance of the Reformation which occurred in the mean time.

8. Give the particulars, with dates, of the final rupture with the Church and Court of Rome, in the reign of Elizabeth. What concessions with a view to reconciliation is Pius IV. said to have been prepared to make?

9. Mention the names of some of the more distinguished of the refugees on account of religion who returned to England after the reign of Mary. With what section of the foreign Reformers had they the closest relations of friendship and sympathy in opinion?

10. Give some account of the versions of Holy Scripture which obtained currency in England previously to the last revision. What was the date of the latter?

HISTORY OF THE REFORMATION.

1. BY what incident was the attention of Gregory the Great directed to the religious condition of the inhabitants of Britain? Relate the proceedings of the mission sent thither by him, and the occasions on which its members came into contact with the British Christians.

2. Write a short account of the life, and discuss the opinions of Berengarius. Name some of his contemporaries who were eminent as Theologians.

3. Narrate the circumstances in which originated the Schism of the Papacy. How long did it continue, and to which of the contending parties did England attach itself?

4. Enunciate the propositions embodied in the 'Six Articles' Act:

and describe the other important enactments which were passed in the same parliamentary Session.

5. Give an account of the part taken by Gardiner in matters affecting religion in the reigns of Henry VIII. and Mary. Mention the title and purport of any theological work published by him.

6. With what objects was the Council of Constance convened? Give an outline of the events connected with it.

7. State what proportions of our present Liturgy are derived immediately from those previously in use. To what portion of Divine service was the term anciently restricted? What portions of the service were in the vernacular at the time of the death of Henry VIII.?

8. Relate the circumstances of the imprisonment, trial, and condemnation of Archbishop Cranmer.

9. In what year was the recension of the Book of Common Prayer in the reign of Elizabeth promulgated? Compare it with the earlier editions, mentioning the respective dates of the latter.

Relate the proceedings of the Convocation and of the Conference held in Westminster Abbey shortly after her accession.

10. State the purport of the Articles known as those of Lambeth. What circumstances gave occasion to their promulgation? Did they ever obtain force as formularies of faith and terms of communion?

HISTORY OF THE REFORMATION.

1. Mention some of the earliest notices in ancient authors of the introduction of Christianity into Britain. Name some distinguished persons of British birth or descent in the first three centuries, and early part of the fourth, who had embraced the religion. At which of the earlier councils do we find the British Church represented?

2. State the principal enactments of the Constitutions of Clarendon. Upon what did they profess to be founded? Describe the series of disputes which arose upon them between the Primate and the King.

3. Write a short history of the life of Cardinal Pole. Mention the title and subject of any of his writings. By whom was he succeeded in the see of Canterbury?

4. Give some account of the books entitled "The Necessary Institution of a Christian man" and "The Erudition of a Christian man." What other books of a devotional or didactic character were set forth by authority in this reign?

5. Describe the more important of the measures passed by Parliament and Convocation in the session under Edward VI.

6. Narrate the circumstances of the insurrection know as the "Pilgrimage of Grace." Out of what public events as its proximate exciting causes did it arise?

7. Describe the work known as the "Reformatio Legum." When was it finally put forth?

8. Relate some particulars of the life of John Rogers. What other influential persons suffered death under the authority of the same commission in the same year?

9. Explain the meaning of the terms "investiture" "præmunire" "provisions" and "annates," and give instances in which they severally became occasions of important contests.

10. Give an outline of the history of the state of religion in England under Elizabeth till the time of the publication of the Bull of excommunication.

HISTORY OF THE REFORMATION.

1. Describe the constitution and functions of Convocation and of other Ecclesiaatical Synods in the Middle ages. At what period was the separation made between the civil and ecclesiastical courts of Jndicature? What important measures were passed in the beginning of the reign of Henry IV. affecting the power of the latter? How long did they continue in force?

2. Mention some of the more important enactments in times anterior to the sixteenth century by which the power of the Roman Pontiff in England was restrained.

3. Give some account of the principal Orders of Mendicant Friars. At what time did they first appear in England? Mention the names of any members of those orders who attained eminence.

4. Write a short history of the life of Cardinal Wolsey. State briefly the arguments used on opposite sides of the question as to the validity of the first marriage of Henry VIII. Mention some particulars of the conduct of Clement VII. in reference to the suit for divorce.

5. Give a sketch of the history of the Suppression of Monasteries. What earlier instances does Engliah History afford which may be regarded as furnishing a precedent?

6. Give a summary of the contents of the Catechism know as Cranmer's. What part did he take in the preparation of the first book of Homilies, and what was the date of its publication? Mention some other of the works written by him: and relate the circumstances of his trial and condemnation.

7. When did the Book of Common Prayer of the reign of Elizabeth come into use? Institute an analysis of its contents, and state what portions of it are analogous in structure to the ancient offices.

8. Name some of the more notable of the foreign divines whose influence had weight in the settlement of doctrinal and ritual questions in the course of the Reformation.

9. What were the subjects of the principal works of Bishop Jewel? Mention some of the propositiona he undertook to maintain against all disputanta in the challenge made by him in his discourse at St. Paul's Cross Nov. 26th, 1559.

10. Give an account of the insurrection in Devonshire in the reign of Edward VI. What demands were made by the rebels in regard of the form of public worship, and terms of communion?

ALGEBRA.

1. What ia the meaning in Algebra of the terms 'factor' and 'coefficient,' and of the symbol a^x?

Prove that $a^4 \times a^5 = a^9$ and that $(a^4)^5 = (a^5)^4$.

2. State the rule for removing brackets from Algebraical expressions. Express $a^2(x-z) - b^2(y-x) + c^2(z-y) - abx + bcy - caz$ in three terms of which x, y, z are respectively factors.

3. Add together $3m - (4n - 7p)$, $3n - (4p - 7m)$, and $3p - (4m - 7n)$; and obtain the numerical result when $m = 2n = 3p = \frac{1}{11}$.

4. Find the difference between $(x+y)^3 + (x+y)^2y + (x+y)y^2$, and $3x^2y + 5y^2x + 2y^3$, and shew by what expression thia difference must be multiplied that the product may be $x^4 - y^4$.

5. Shew that the coefficient of x in the expansion of $(x-a)(x-b)(x-c)$ is the coefficient of x^2 in the expansion of

$$\left(x+\frac{1}{a}\right)\left(x+\frac{1}{b}\right)\left(x+\frac{1}{c}\right)a.b.c.$$

6. Reduce to their simplest forms:

$$\frac{a^2+6a-7}{a^2+8a+7},$$

$$\frac{z}{x+y-z}-\frac{y}{z+x-y}+\frac{x}{z-y-x}.$$

7. Define Ratio. If a straight line be divided into two parts so that the rectangle contained by the whole and one part is equal to the square of the other part, find the ratio of the parts.

8. When are four quantities said to be proportional?

If $a:b::c:d$, then $a:a+b::a+c:a+b+c+d$.

9. Explain fully the meaning of the expression $A \propto B$.

Shew that one pair of corresponding values of A and B must be known that any other pair may be determined.

10. Solve the equations:

(1) $x+\dfrac{3x-10}{5}=4-\dfrac{5x-10}{3}$. (2) $\dfrac{2x+3}{3x+2}-\dfrac{2x-3}{3x-2}=1$.

(3) $(mx+a)(nx-b)=0$. (4) $\left.\begin{array}{l}\dfrac{a^2}{x^2}+\dfrac{y^2}{b^2}=6,\\ \dfrac{a}{x}.\dfrac{b}{y}=1.\end{array}\right\}$

11. In order to resist cavalry a battalion is usually formed into a hollow square, the men being 4 deep, but a single company is usually formed into a solid square. If the square formed by a battalion, consisting of 7 equal companies, is 16 times as large as one of its companies' squares, find how many men there are in a company, assuming every man to occupy the same space.

ALGEBRA.

1. What is the meaning in Algebra of the terms 'power' and 'square root'? Prove that $a^4 \div a^5 = \dfrac{1}{a}$, and, assuming $-a \times -a = +a$, that $\sqrt{(a^4)} = \pm a^2$.

2. State the rule for including Algebraical expressions in brackets; express $(a-c)x^2-(b-a)y^2+(c-b)z^2-axy+byz-czx$ in three terms of which a, b, c are respectively factors.

3. Add together $9m-(5n+2p)$, $9n-(5p+2m)$, and $9p-(5m+2n)$, and obtain the numerical result when $p=2n=3m=\frac{3}{11}$.

4. Find the difference between $(1+x)^3+(1+x)^2y+(1+x)y^2+y^3$, and $3x(x+1)+y(y+1)+2xy+1$, and shew by what expression this difference must be multiplied that the product may be y^4-x^4.

5. Shew that the coefficient of x in the expansion of $(x-a)(x-b)(x+c)$ is the coefficient of x^2 in the expansion of

$$\left(x-\frac{1}{a}\right)\left(x-\frac{1}{b}\right)\left(x+\frac{1}{c}\right)abc.$$

6. Reduce to their simplest forms:

$$\frac{a^2 - a - 20}{a^2 + a - 12},$$

$$\frac{x}{y + z - x} - \frac{y}{z + x - y} + \frac{z}{x - y - z}.$$

7. Define Ratio. If a straight line be divided into two parts so that the rectangle contained by the whole line and one part is equal to six times the square of the other part; find the ratio of the parts.

8. When are four quantities said to be proportional?

if $a : b :: c : d$, then $a : a + b :: ac - bc : ac - bd$.

9. Explain fully the meaning of the expression $A \propto \frac{1}{B}$, and shew that one pair of corresponding values of A and B must be known that any other pair may be determined.

10. Solve the equations:

(1) $x + \frac{5x - 8}{3} = 6 - \frac{3x - 8}{5}$. (2) $\frac{3x + 4}{4x + 3} - \frac{3x - 4}{4x - 3} = \frac{1}{2}$.

(3) $\left(\frac{x}{m} - a\right)\left(\frac{x}{n} - b\right) = 0$. (4) $\left.\begin{array}{l} \frac{a^2}{x^2} - \frac{y^2}{b^2} = 12 \\ \frac{a}{x} \cdot \frac{b}{y} = 2 \end{array}\right\}$.

11. In order to resist cavalry a battalion is usually formed into a hollow square, the men being four deep, but a single company is usually formed into a solid square. If the hollow of the square of a battalion, consisting of seven equal companies, is nine times as large as one of its companies' squares, find how many men there are in a company, assuming every man to occupy the same space.

ALGEBRA.

1. Explain the meaning of "negative quantities," "factors," "coefficients," and "indices."

2. Simplify the expression $4a - [3b - \{2a - (4a - 3b)\}]$, also

$$2a - [a - \{b(x + y) - a(1 + b)\}].$$

3. Multiply together $x^2 - xy + y^2$ and $x^2 + xy + y^2$, and find the continued product of $x^2 - y^2$, $x^2 + y^2$, $x^4 + y^4$ and $x^8 + y^8$.

4. Simplify the following:

$$\frac{(x - y)(x^2 - xy + y^2)}{x^3 + y^3} \times \frac{(x + y)(x^2 + xy + y^2)}{x^2 - y^2}; \quad \frac{x^6 - y^6}{x^8 + x^4y^4 + y^8}.$$

5. Divide $x^4 - (a + b + c + d)x^3 + (ab + ac + ad + bc + bd + cd)x^2 - (bcd + cda + dab + abc)x + abcd$ by $x^2 - (a + b)x + ab$; also $x^{2^n} - 1$ by $x^{2^{n-1}} - 1$.

6. Give the geometrical definition of proportion.

If quantities be proportional according to the algebraical definition, they are proportional according to the geometrical definition.

7. If a, b, c, d are proportionals, shew that $a + b : b :: c + d : d$.

If a crew, which can row from Baits-bite to Searle's boat-house in 30 minutes, can row from Searle's to Baits-bite in 25 minutes, compare the rates of the stream and the boat.

8. When is one quantity said to vary inversely as another?

If x varies inversely as y, y directly as z, and $x = 2$, when $z = 3$, find the relation between x and z.

9. Solve the following equations:

(1) $\frac{x}{2} - \frac{x}{3} + \frac{1}{4} = \frac{x}{4} + \frac{1}{6}$. (2) $\frac{8}{x} - \frac{x}{2} = 3$.

(3) $\left.\begin{aligned} x^2 - 2xy &= 24 \\ xy - 2y^2 &= 4 \end{aligned}\right\}$. (4) $\left.\begin{aligned} ay + bx &= 2xy \\ cy + dx &= 3xy \end{aligned}\right\}$.

10. A can do half as much work as B, B half as much as C, and together they can complete a piece of work in 66 days, in what time could they singly do the work?

11. On a side at cricket, consisting of 11 men, one-third more were bowled out than caught, one-half more caught than stumped, and one was run out, how many were bowled, caught, and stumped, respectively?

ALGEBRA.

1. Explain the meaning of "positive quantities," "factors," "coefficients," and "terms."

2. Simplify the expression,

$6a - [4b - \{4a - (6a - 4b)\}]$, also $4a - [2a - \{2b(x + y) - 2a(1 + b)\}]$.

3. Multiply together $x^4 - x^2y^2 + y^4$ and $x^4 + x^2y^2 + y^4$; and find the continued product of $x - y$, $x + y$, $x^2 + y^2$, and $x^4 + y^4$.

4. Simplify the following:

$$\frac{(x^2 - y^2)(x^4 - x^2y^2 + y^4)}{x^6 + y^6} \times \frac{(x^2 + y^2)(x^4 + x^2y^2 + y^4)}{x^6 - y^6}; \quad \frac{x^3 - y^3}{x^4 + x^2y^2 + y^4}.$$

5. Divide $x^3 - (a + b + c)x^2 + (bc + cd + da)x - abc$, by $x^2 - (a + b)x + ab$, also $x^{2n} - 1$ by $x^{2^{n-1}} + 1$.

6. Give the geometrical definition of proportion.

If quantities be proportional according to the algebraical definition, they are proportional according to the geometrical definition.

7. Give the algebraical definition of proportion.

If a crew, which can row from Ely to Upware in 60 minutes, can row from Upware to Ely in 55, compare the rates of the stream and boat.

8. When is one quantity said to vary directly as another?

If x varies directly as y, y inversely as z, and $x = 3$, when $z = 4$, find the relation between x and z.

9. Solve the following equations:

(1) $\frac{x}{3} - \frac{x}{4} + \frac{1}{6} = \frac{x}{8} + \frac{1}{12}$. (2) $\frac{9}{x} - \frac{x}{3} = 2$.

(3) $\left.\begin{aligned} my + nx &= 3xy \\ py + qx &= 4xy \end{aligned}\right\}$. (4) $\left.\begin{aligned} 2x^2 - xy &= 10 \\ 2xy - y^2 &= 4 \end{aligned}\right\}$.

10. Three men, whose capacities for work are as the numbers 3, 4, 5, can complete a piece of work in 60 days, in what time could they singly do the work?

11 On a side at cricket, consisting of 11 men, one-third more were bowled than run out, and three times as many run out as stumped, two were caught out, how many were bowled, stumped, and run out, respectively?

EXAMINED AND APPROVED.

FIRST CLASS.

Ds	Atkinson, F. H.	Caius
	Baker	Magd.
	Best	Joh.
	Beverley	Joh.
	Davey	Queens'
	Fenn	Trin.
	Gibbs	Trin.
	Gorst	Trin.
	Grove	Trin.
	Grylls	Joh.
	Harries	Jesus
	Hose	Joh.
	Hosegood	Sidney
	Kershaw	Cath.
	Lewthwaite	Trin.
	Mabson	Trin.
	Moncrieff	Trin.
	Moore	Magd.
	Newman	Cath.
	Nott	Trin.
	Pardoe, J.	Trin.
	Pidcock	Corpus
	Powell, D.	Trin.
	Roberts	Joh.
	Robinson	Jesus
	Savage	Caius
	Scott	Trin.
	Skeels	Emm.
	Sturges	Emm.
	Walker	Caius
	Wilson, R. H.	Trin.
	Wolley	Emm.
	Yardley	Joh.
	Yeoman	Trin.
	Young, F. C.	Trin.

SECOND CLASS.

Ds	Adams	Christ's
	Addison	Corpus
	Allen	Trin.
	Alston	Joh.
	Amherst, Hon. P.	Trin.
	Anderson	Corpus
	Atherton	Joh.
	Baillie	Trin.
	Baring-Gould	Joh.
	Beavan	Joh.
	Blake	Corpus
	Blake	Trin.
	Bottom	Emm.
	Bowen	Trin.
	Brent	Queens'
Ds	Corfield	Trin.
	Davis	Joh.
	Dickinson	Caius
	Duke	Joh.
	Dyson	Trin.
	Evans	Emm.
	Forster	Trin.
	Ginders	Joh.
	Graham	Pet.
	Griffiths	Trin.
	Hawkrigg, J.	Clare
	Hayter	Emm.
	Heathfield	Trin.
	Jamieson	Emm.
	Kempson	Emm.
	Mayne	Joh.
	Mc Laughlin	Magd.
	Mirehouse, J.	Clare
	Page	Joh.
	Palmour	Emm.
	Rowlands, J.	Corpus
	Rowlands, L. J.	Corpus
	Rudge	Corpus
	Sargant	Trin.
	Seaton	Trin.
	Tarleton	Joh.
	Thorne	Caius
	Trevelyan	Christ's
	Wilkinson	Corpus
	Wilson	Queens'

THIRD CLASS.

Ds	Apthorp	Emm.
	Balls	Pet.
	Bamford	Joh.
	Bishop	Christ's
	Boddington	Pet.
	Bowen	Caius
	Bragge	Trin.
	Clarke	Emm.
	Dashwood	Christ's
	Dobson	Trin.
	Fawcett	Trin.
	Frost	Trin.
	Gorst	Joh.
	Henty	Trin.
	Knox, A. B.	Trin.
	Manners-Sutton	Magd.
	Marsden	Queens'
	Meeking	Trin.
	Morton	Trin.
	Onslow	Trin.
	Pincott	Caius

Ds	Pomeroy	Trin.
	Rule	Corpus
	Selwyn	Joh.
	Shirley	Trin.
	Staunton	Joh.
	Tate	Trin.
	Taylor	Queens'
	Tilston	Trin. H.
	Tooth	Trin.
	Valentine	Joh.
	Wailes	Caius
	Watkins	Trin.
	Wilkinson	Cath.
	Wilson. W. D.	Trin.

FOURTH CLASS.

Ds	Agassiz	Joh.
	Beavan	Caius
	Brailsford	Trin. H.
	Brymer	Trin.
	Clarke, R. D.	Caius
	Cogswell	Sidney
	Elliot	Trin.
	Ely	Joh.
Ds	Ewen	Trin.
	Gardner	Corpus
	Goodchild	Emm.
	Henniker	Trin.
	Hodgson	Pet.
	Hole	Christ's
	Hopton	Trin.
	Matthews	Magd.
	Melville	Trin.
	Perceval	Trin. H.
	Rogers	Queens'
	Simcox	Joh.
	Slight	Joh.
	Stevenson	Trin.
	Tatham	Trin.
	Walker, C.	Trin.
	Walker, T. L.	Joh.
	Webber	Trin. H.

ÆGROTANT.

	Hall	Pet.
	Shaw	Caius
	Wharton	Queens'

SENATE-HOUSE EXAMINATION PAPERS.

THEOLOGICAL EXAMINATION, October, 1860.

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Swann	B.A.	Caius
Taylor	B.A.	Joh.
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Vyvyan	B.A.	Caius
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Walne	LL.B.	Emm.
Warlow	B.A.	Joh.
Warwick	B.A.	Magd.
Watton	B.A.	Magd.
Wetherell	B.A.	Joh.
Whitley	B.A.	C. C.
Williams	B.A.	Joh.
Wills	B.A.	Sid.

HISTORICAL BOOKS OF THE OLD TESTAMENT.

1. State in the language of Scripture the causes that led God to punish the earth with a flood. How long did the waters prevail on the earth, and what incidents took place at the close of the time?

2. Give an account of the life of Abraham up to the birth of Isaac, and state the number and substance of the promises that were made to him during this time. What was it that he believed, when God counted that belief to him for righteousness?

3. Describe fully the events alluded to in the following passages:

(α) 'By faith Jacob when he was a dying blessed both the sons of Joseph; and worshipped, leaning upon the top of his staff.' (Heb. xi. 21.)

(β) 'And they made a calf in those days and offered sacrifice unto the idol.' (Acts vii. 41.)

(γ) 'Neither let us commit fornication as some of them committed, and fell in one day three and twenty thousand.' (1 Cor. x. 8.)

4. On what occasions did the following miracles take place; the Leprosy of Miriam, the Budding of Aaron's rod, the Parting of the waters of the Jordan, and the Standing still of the Sun and Moon?

5. Give a brief account of the life and conquests of Joshua, and some notices of the three most famous of the military Judges that followed him. Which of the Judges received more especially *direct* appointment from God, and in what way was it vouchsafed?

6. Mention some of the leading events in sacred history that took place during the lives of Eli and Samuel. How long did the latter judge Israel, and what was the general character of his judicature?

7. Give an account of the three great offences of Saul, and the punishments that followed. What was the nature of his conduct to David, and in what way did David act towards him in return?

8. State briefly the events in the life of David during the earlier portion of his reign, and prior to his rule over all Israel. When did this latter portion of his reign commence, and how long did it last?

9. Enumerate some of the punishments with which God visited David for his sin in the matter of Uriah. Give also an account of his sin in numbering the people, and the circumstances which followed.

10. Give an account of the reign of Jeroboam. What was the prophecy uttered before him at Bethel by the man of God from Judah, and how was it fulfilled? What was the subsequent sin and punishment of him who uttered the prophecy?

11. Describe briefly the principal events in the reign of Asa, Ahab, Jehu, and Josiah, and give a full account of the reformation set on foot by the last-mentioned of these kings.

12. State the situation of Shechem, Bethel, the Plains of Moab, Gilgal, the Waters of Merom, Hebron, Kirjath-jearim, Mount Olivet, Ramoth-gilead, and the principal events connected with each of these places.

THE GOSPELS AND ACTS; THE EPISTLES TO THE ROMANS AND TO TIMOTHY; AND THE FIRST EPISTLE OF ST. PETER.

1. TRANSLATE the following passages, adding short explanatory notes where required:

(α) Beginning, Ἐλθόντων δὲ αὐτῶν εἰς Καπερναούμ, κ.τ.λ.
Ending, ἀντὶ ἐμοῦ καὶ σοῦ.—Matth. xvii. 24—27.

(β) Beginning, Καὶ παρατηρήσαντες ἀπέστειλαν ἐγκαθέτους, κ.τ.λ.
Ending, καὶ θαυμάσαντες ἐπὶ τῇ ἀποκρίσει αὐτοῦ ἐσίγησαν.
Luke xx. 20—26.

(γ) Beginning, Μετὰ δὲ ταῦτα ἠρώτησε τὸν Πιλάτον ὁ Ἰωσὴφ ὁ ἀπὸ Ἀριμαθαίας, κ.τ.λ.
Ending, ὅτι ἐγγὺς ἦν τὸ μνημεῖον, ἔθηκαν τὸν Ἰησοῦν.
John xix. 38—42.

(δ) Beginning, Ἐγένετο δὲ ἐν Ἰκονίῳ, κ.τ.λ.
Ending, κἀκεῖ ἦσαν εὐαγγελιζόμενοι.—Acts xiv. 1—7.

(ε) Beginning, Τὸ δὲ πνεῦμα ῥητῶς λέγει, κ.τ.λ.
Ending, καὶ τῆς καλῆς διδασκαλίας ᾗ παρηκολούθηκας.
1 Tim. iv. 1—6.

Illustrate this passage from early Church History.

(ζ) Beginning, Πρεσβύτερους τοὺς ἐν ὑμῖν παρακαλῶ, κ.τ.λ.
Ending, κομιεῖσθε τὸν ἀμαράντινον τῆς δόξης στέφανον.
1 Pet. v. 1—4.

2. Translate and explain:

(α) Beginning, Πᾶς γὰρ πυρὶ ἁλισθήσεται, κ.τ.λ.
Ending, καὶ εἰρηνεύετε ἐν ἀλλήλοις.—Mark ix. 49, 50.

(β) Beginning, Εἰ γὰρ σύμφυτοι γεγόναμεν τῷ ὁμοιώματι, κ.τ.λ.
Ending, Ὁ γὰρ ἀποθανὼν δεδικαίωται ἀπὸ τῆς ἁμαρτίας.
Rom. vi. 5, 6.

(γ) Beginning, Καὶ ὁ λόγος αὐτῶν ὡς γάγγραινα νομὴν ἕξει, κ.τ.λ.
Ending, καὶ ἀποστήτω ἀπὸ ἀδικίας πᾶς ὁ ὀνομάζων τὸ ὄνομα Χριστοῦ.—2 Tim. ii. 17—19.

3. "He alone describes on several occasions the look and feeling of the Lord, and preserves the very Aramaic words which He uttered." Illustrate this remark by quotations from the Gospel to which it refers.

4. Define clearly the sense in which St. Paul uses πίστις, as distinguished from νόμος, in his Epistle to the Romans.

5. Mention the particulars which may be gathered from the New Testament respecting the life and character of Timothy. What hints do we derive from it concerning the duties of the deacons in apostolic times?

6. To what class of converts was the first Epistle of St. Peter addressed? Support your answer by quotations from it.

7. Describe the position of the following places: Bethlehem—Nazareth—Lydda—Melita—Antipatris—Puteoli—Cenchrea—Thessalonica. State briefly the persons and events with which these names are connected in the New Testament.

8. Explain with derivations:

προσήλυτος—οἱ γραμματεῖς—ὑποκρίτης—γέεννα—διυλίζοντες τὸν κώνωπα—πυγμῇ—παραβολή—παροιμία—ἀνάθεμα ἀπὸ τοῦ Χριστοῦ—ἐπίσκοπος—ὑποτύπωσιν ἔχε ὑγιαινόντων λόγων.

9. Retranslate into GREEK the following passages from the Authorized Version, and point out any amendments of which they are capable:

"Who his own self bare our sins in his own body on the tree."

"All Scripture is given by inspiration of God, and is profitable for doctrine."

"Charge them that are rich in this world, that they be not highminded, nor trust in uncertain riches, but in the living God, who giveth us richly all things to enjoy."

"For if Abraham were justified by works, he hath whereof to glory; but not before God."

"And he said unto them, Take heed, and beware of covetousness: for a man's life consisteth not in the abundance of the things which he possesseth."

"Almost thou persuadest me to be a Christian."

ARTICLES OF RELIGION.

I. GIVE some account of the *Confession of Augsburg*, and shew that it exercised an important influence upon our *Articles of Religion*. Trace concisely the history of the Articles from the accession of Queen Elizabeth to the year 1571. Have any important changes been introduced since that date? When, and under what circumstances, was *His Majesty's Declaration* prefixed to the Articles?

II. Shew that the Old Testament supports the assertions of the 1st Article as against

1. Polytheism. 2. Pantheism. 3. Anthropomorphism.

III. Article II. (1) Describe very briefly the *principal* ancient and modern heresies against which this Article is directed.

(2) Shew that Christ was foretold in the Old Testament as "very God and very man."

(3) Prove from the New Testament that Christ died

(*a*) To reconcile His Father to us. (*b*) To be a sacrifice for sin.

How would you meet the objection that the language of the New Testament writers is not to be understood literally inasmuch as they were "Jews writing to Jews"?

IV. How did the Article *Of the Holy Ghost* stand in the Articles of 1552? Have you anything to remark upon the change?

Give a concise account of the controversy on the words *Filioque* with reference to the Procession of the Holy Ghost, and shew that the language of the Western Church agrees with holy Scripture.

By what passages of the New Testament would you prove the Personality of the Holy Ghost? Shew that the argument is strengthened by an appeal to the original Greek.

V. Write a *brief* essay on the Article *Of the Justification of Man*, with a view to "express more largely" (in the language of the Homily

if you please) the doctrine therein taught, and to shew its agreement with holy Scripture.

VI. Article XVI. *Of sin after Baptism.* How was the subject of this Article treated in the Articles of 1552? Give some account of the early heretics whose opinions are here condemned. What reason have we for believing that the Article was directed partly against them?

By what texts and arguments from holy Scripture would you comfort a person distressed in conscience at having committed, as he supposed, the unpardonable sin?

VII. Write down the opinion expressed by our Church on the doctrine of Transubstantiation, and establish each point of it by argument or quotation. Give the history of the rise and formal recognition of the doctrine in the Church of Rome, and quote if you can the words of the Council of Trent on the subject. What is meant by Consubstantiation?

VIII. *καὶ οὐδὲ εἷς τι τῶν ὑπαρχόντων αὐτῷ ἔλεγεν ἴδιον εἶναι, ἀλλ' ἦν αὐτοῖς ἅπαντα κοινά.*—Acts iv. 32.

ἐγὼ δὲ λέγω ὑμῖν, μὴ ὀμόσαι ὅλως.—Matt. v. 34.

What is the teaching of the Articles on these two subjects? Shew that it is not contrary to these and other like passages of the New Testament.

LITURGY OF THE CHURCH OF ENGLAND.

1. Mention any errors or defects in the mode of performing Divine Service in the times immediately before the Reformation. Illustrate your remarks by reference to any old Service Books. "These many years past this godly and decent order of the Ancient Fathers hath been altered, broken, and neglected." Pref. 1549. What "order" is here meant? What rules are laid down in our Prayer Book for the saying of the Lord's Prayer, the Creed, and for the reading of the Lessons at Morning and Evening Prayer?

2. Compare the forms of Absolution in Morning Prayer, the Communion Service, and Visitation of the Sick. Under what circumstances is the last appointed to be used?

3. What traces are there of the use of a Creed in the New Testament? Give some account of the history of the following clauses: "The Lord and Giver of Life, Who proceedeth from the Father and the Son." Mention some of the days on which the Athanasian Creed is appointed to be said. What errors were the following clauses intended to condemn?

Neither confounding the Persons, nor dividing the Substance—Perfect God and Perfect Man, of a reasonable soul and human flesh subsisting—Who although He be God and Man, yet He is not two but one Christ.

4. Quote passages from the Prayer Book in which the following words are found, and give, where you can, the corresponding Greek and Latin words:

Catholic, charity, confirm, contrite, endeavour, heresy, incomprehensible, justification, mortify, oblations, prevent, Passion, redeem, regenerate, renounce, salvation, schism, tribulation, vocation.

5. What are the proper Lessons for Easter Sunday, Whit Sunday, and All Saints' Day? Write out the Collect for one of these days. Translate: (1) Deus, cui omne cor patet, et quem nullum latet secretum; purifica per infusionem Sancti Spiritus cogitationes cordis nostri; ut perfecte te diligere, et digne laudare mereamur. (2) Deus, qui ho-

dierna die unigenitum tuum gentibus stella duce revelasti: concede propitius ut qui jam te ex fide cognovimus, usque ad contemplandam speciem tuæ celsitudinis preducamur. In what part of our Service are these Collects found?

6. Explain the meaning of the word Catechism. From what Greek word is it derived? Quote passages from the New Testament where the word is used.

My Baptism wherein I was made a member(1) of Christ, the child(2) of God, and an inheritor(3) of the Kingdom of Heaven.

(1) Illustrate by reference to St. Paul's language.

(2) Confirm this from Scripture, and explain the sense in which you understand (3).

Compare the whole passage with the language of the Service for the Baptism of Infants.

Give accurately the answer to the following question: "What is required of those who come to the Lord's Supper?" Shew that the same requisites are mentioned in the Communion Service.

7. Mention any changes which were made in successive Prayer Books

(1) in the *Rubrics* of the Communion Service,

(2) in the Prayer for Christ's Church Militant,

(3) in the Prayer of Consecration,

(4) in the form of words used in delivering the Bread and the Cup.

Assign reasons for such changes.

8. What steps does the Rubric direct to be taken before a person of riper years is admitted to Baptism? When was the Office for Baptism of Adults added to the Prayer Book? Why was it called for specially at that time?

9. Mention some of the alterations made in the Book of Common Prayer in 1604. Explain by reference to the Preface the principles on which the last Review was conducted.

HISTORY OF THE FIRST THREE CENTURIES.

1. What traditions were current in the early Church respecting the latter part of the lives of St. Peter, St. Paul, and St. John?

2. Mention the chief centres of the Christian faith, and give a sketch of the constitution and ritual of the primitive Churches at the beginning of the second century.

3. Describe the characteristics of the Catechetical School at Alexandria. Who were its chief representatives?

4. Who were the principal adversaries of Christianity during the second century? Give a short account of the Apologists during the same period.

5. Who was Novatian? What were his opinions? By what name were his followers distinguished?

6. Write a short account of Cyprian and the chief controversies in which he was engaged.

7. By what natural causes was the progress of Christianity assisted or impeded during the first three centuries?

HISTORY OF THE REFORMATION IN ENGLAND.

1. Mention any arguments which have been advanced in support of the Pope'a claim to jurisdiction in England. Can you shew from historical facts that such arguments are unsound? How did the authority of the Pope make itself felt in England before the Reformation?

2. Give some account of the internal condition of the Church of England in the 14th and 15th centuries.

What was done by Wickliffe to prepare the way for the Reformation?

3. Give the date of Henry's rupture with the Pope, and explain briefly how it was brought about. What do you understand by the Royal Supremacy in England? How is it exercised?

4. Give an outline of the life of Cranmer and compare his character as a Reformer with that of Wickliffe. From what motives and with what hopes does it appear that he acquiesced in the Dissolution of the Monasteries? Mention some of the consequences of this measure.

5. What steps were taken to advance the work of the Reformation during the reign of Edward VI.? How was its progress affected by the political condition of England at this time?

6. Mention the names of any of the exiles in Queen Mary's reign who returned on the accession of Elizabeth. Give an account of any of their writings. The following is a note by Bishop Bonner: "A.D. MDLIX die maii xxx vocatus ad concilium recusavi præstare juramentum." What oath was this? Determine by the date the circumstance to which he alludes.

7. Give an outline of the life of Archbishop Parker.

LIST OF PERSONS WHO PASSED THE EXAMINATION IN THEOLOGY.

Abbott	B.A.	Christ's	Dunning	B.A.	Christ's
Ainger	B.A.	Trin. H.	Eaton	B.A.	Joh.
Andras	B.A.	Joh.	Farman	B.A.	Joh.
Arthur	B.A.	Trin.	Festing	B.A.	Trin.
Bagshaw, Ex. for B.A.		Joh.	Gilbert	M.A.	Trin.
Bailey	B.A.	C. C.	Glegge	B.A.	Trin.
Ball	B.A.	Caius	Goggs	B.A.	Christ's
Bassett	B.A.	Trin.	Graham-Pigott, Ex. for B.A.		Pet.
Binyon	B.A.	Trin.	Granger	B.A.	Joh.
Bird	B.A.	Trin.	Green	M.A.	Joh.
Bramall	B.A.	Joh.	Harrison	B.A.	Trin.
Brooks	B.A.	Trin.	Head	B.A.	Caius
Bunbury	B.A.	Joh.	Heale	B.A.	Trin.
Cary	B.A.	Trin.	Heaton	B.A.	C. C.
Cay	B.A.	Emman.	Henham	B.A.	Christ's
Chandler	B.A.	Caius	Holland	B.A.	Trin.
Chell	B.A.	Joh.	Jackson	B.A.	Joh.
Clark	B.A.	Trin.	†Jenour	B.A.	Christ's
Clementson	B.A.	Emman.	Jickling	B.A.	Emman.
Collier	B.A.	Caius	Jones	B.A.	Pemb.
Corbet	B.A.	Trin.	Kemm	B.A.	C. C.
Cornford	B.A.	Emman.	Kidd	B.A.	Emman.
Covey	B.A.	Caius	King	B.A.	Queens'
Crabtree	B.A.	Cath.	Knight	B.A.	Caius
Curgenven	B.A.	Jes.	Lambert	B.A.	C. C.
D'Almaine	B.A.	Queens'	Lane	B.A.	Joh.
De Chair	B.A.	Jes.	Latham	B.A.	Emman.
Dowle	B.A.	Emman.	Mason	B.A.	Christ's

† Passed in Hebrew.

Metcalfe	B.A.	Joh.	Salwey	B.A.	Trin.
Newton	B.A.	Joh.	Sayer	B.A.	Trin.
Nimmo-Howard	B.A.	Clare	Sellwood	B.A.	Joh.
Nixon	B.A.	C. C.	Shackleton	B.A.	Clare
Nuttall	B.A.	Cath.	Squibb	B.A.	Joh.
Page	B.A.	Christ's	Stapleton	B.A.	Trin. H.
Palmour	B.A.	Joh.	Stone	B.A.	Pet.
Porter	B.A.	C. C.	Stowell	B.A.	Caius
Porter	M.A.	Queens'	Swann	B.A.	Caius
Pratt	B.A.	Jes.	Taylor	B.A.	Joh.
Previté	B.A.	Joh.	Tibbits	B.A.	Joh.
Price	B.A.	Clare	Tilbury	B.A.	Emman.
Prowse	B.A.	Caius	†Vines	B.A.	C. C.
Raven	B.A.	Joh.	Vyvyan	B.A.	Caius
Remington	B.A.	Magd.	Walne	LL.B.	Emman.
Roberts	B.A.	Jes.	Warlow	B.A.	Joh.
Roberts	B.A.	Emman.	Watton	B.A.	Magd.
Robinson	B.A.	Trin.	Wetherell	B.A.	Joh.
Rowsell	B.A.	Joh.	Wills	B.A.	Sid.

† Passed in Hebrew.

PREVIOUS EXAMINATION, October, 1860.

Examiners:

J. Porter, M.A., *St. Peter's College.*
A. A. Ellis, M.A., *Trinity College.*
A. Beard, M.A., *St. John's College.*
J. M. Fletcher, M.A., *Caius College.*
A. Pownall, M.A., *St. Catharine's College.*
J. B. Pearson, M.A., *Emmanuel College.*
B. W. Beatson, M.A., *Pembroke College.*
J. Rickards, B.A., *Sidney College.*

PALEY'S EVIDENCES.

1. How does Paley maintain the assertion that in miracles adduced in support of revelation there is not any such antecedent improbability as no testimony can surmount?

2. What do we mean, when we say, strictly speaking, that a fact is *contrary to experience?*

3. How does Mr. Hume state the case of miracles?

4. What *two points* does Paley say are necessary to be made out to support the Proposition which stands at the head of the first nine chapters?

5. Show that the first teachers of Christianity would find no protection in the general disbelief of the popular Theology.

6. What evidence is furnished by Tacitus as to the activity and sufferings of the first teachers of Christianity, and what *three things* are proved by the passage which Paley quotes from his writings?

7. Show that the account which our Scriptures contain is the story for which the early propagators of our religion suffered.

8. Under what division does Paley treat the subject of the Morality of the Gospel?

9. Show the Originality of Christ's character.

10. Facinus est vinciri civem Romanum; scelus verberari.—CIC. *in Verr.*

Cædebatur virgis, in medio foro Messanæ, civis Romanus, Judices: cum interea nullus gemitus, nulla vox alia, istius miseri inter dolorem crepitumque plagarum audiebatur, nisi hæc, Civis Romanus sum.

Translate these passages and show how they bear upon the genuineness of the New Testament writings.

11. What would be the real effect of overpowering evidence of the truth of Christianity?

PALEY'S EVIDENCES.

1. WHAT is the modern objection to miracles which Paley felt himself called upon to answer? Upon what principle does that objection profess to be founded?

2. On what is the force of experience as an objection to miracles founded?

3. Prove that there is no solid foundation in Mr. Hume's conclusion respecting miracles, by trying his theorem upon a simple case.

4. Write down the two propositions which Paley establishes in the first part of the Evidences.

5. Show that it is highly probable from the *nature of the case* that the propagation of the Christian Religion was attended with difficulty and danger.

6. To what *two points* does the information to be drawn from the younger Pliny's Letter to the Emperor Trajan principally relate? Give the quotation.

7. Show that the story for which the early teachers of our religion suffered, was a *miraculous* story.

8. What does Paley observe respecting the *negative* character of our Lord's discourses?

9 Give instances of the candour of the new Testament writers.

10. Judæos, impulsore Chresto assidue tumultuantes, Roma expulit.

SUET. *Claud.* c. XXV.

Quemadmodum eadem *catena* et custodiam et *militem* copulat; sic ista, quæ tam dissimilia sunt, pariter incedunt.—SENECA, *Ep.* v.

Translate these passages, and show how they bear upon the genuineness of the New Testament writings.

11. How does Paley meet the objection, that the Christian miracles are not recited or appealed to in the Epistles of the Apostles so fully or frequently as might have been expected?

ARITHMETIC.

1. FIND the sum, difference, product, and quotient of 1653125 and 13225.

2. Find the square, and square root of ·007569.

3. There are three quantities: (1) 4 miles, (2) 4 furlongs, (3) £2. Multiply one of these by the quotient of the other two; state accurately the result of the operation, and perform it in as many different ways as possible.

4. Multiply $99\frac{423}{423}$ by 324; and find the value of $\dfrac{6\frac{11\frac{13}{60}}{12}}{14}$ of a week in days, hours, &c.

5. Find the value of ·51875 of a £.; and $\cdot 10\dot{7}1428\dot{5}$ of a cwt.

6. State the tests of divisibility of numbers by 4, 9, and 11; and apply them to the number 71016.

7. What is the value of a cargo of Tallow, weighing 515 tons at 51*s.* 3*d.* per cwt.?

8. Five per cent. on a given sum amounts to £25. 13*s.* 4*d.* Find $4\frac{3}{4}$ and $4\frac{1}{2}$ per cent. on the same sum.

9. Define Interest and Discount. What is the Discount on £429. 5*s.* due 3 months hence at 4 per cent. per annum?

10. Two Bills for £456. 5*s.* and £274. 2*s.* 6*d.* are due on the 1st and 30th June respectively. What is their value on the 20th June, interest being reckoned at the rate of 5 per cent. per annum?

11. Divide £3920 amongst 4 persons in the proportions of 2, 4, 6, 8.

12. A speculator sells at a profit of 50 per cent.; but his purchaser fails, and only pays 10*s.* in the £. How much per cent. does the speculator gain or lose by his venture?

13. *A* and *B* run a race. *A* starts at the rate of 400 yards a minute, but in every successive minute increases his pace by a yard a minute: *B* diminishes his pace by the same, and is overtaken by *A* in 4 minutes. What was *B*'s pace at starting?

ARITHMETIC.

1. FIND the sum, difference, product, and quotient of 2756250 and 11025.

2. Find the square and square root of ·006084.

3. There are three quantities (1) 5 gallons, (2) 5 quarts, (3) 6 hours. Multiply one of these by the quotient of the other two: state accurately the result of the operation, and perform it in as many different ways as possible.

4. Multiply $99\frac{573}{574}$ by 274; and find the value of $\dfrac{3\dfrac{11\frac{7}{12}}{220}}{4}$ of a mile in furlongs, yards, &c.

5. Find the value of ·53125 of a £.; and $\cdot 17\dot{8}5714\dot{2}$ of a cwt.

6. State the tests of divisibility of numbers by 3, 8 and 11; and apply them to the number 370524.

7. What is the value of a cargo of sugar weighing 756 tons at 28*s.* 6*d.* per cwt.?

8. Five per cent. on a given sum amounts to £32. 6*s.* 8*d.* Find $5\frac{1}{4}$ and $5\frac{1}{2}$ per cent. on the same sum.

9. Define Interest and Discount. What is the Discount on £328. 5*s.* due 4 months hence at 3 per cent. per annum?

10. Two Bills for £273. 15*s.* and £456. 17*s.* 6*d.* are due on the 2nd and 22nd July respectively. What is their value on the 12th July, interest being reckoned at the rate of 5 per cent. per annum?

11. Divide £3264 amongst 4 persons in the proportions of 1, 3, 5, 7.

12. A speculator sells at a profit of 75 per cent.; but his purchaser fails, and only pays 5*s.* in the £. How much per cent. does the speculator gain or lose by his venture?

12. *A* and *B* run a race. *A* starts at the rate of 400 yards a minute and in every successive minute diminishes his pace by a yard a minute. *B* increases his pace by the same, and overtakes *A* in four minutes. What was *B*'s pace at starting?

EUCLID.

1. Define angle, and the kinds of angles, figure, rhombus, gnomon, segment, similar segments.

2. The angles at the base of an isosceles triangle are equal to one another; and if the equal sides be produced, the angles upon the other side of the base shall be equal.

3. To bisect a given finite straight line.

4. The angles which one straight line makes with another upon one side of it, are either two right angles, or are together equal to two right angles.

5. If one side of a triangle is greater than another, the angle opposite the greater shall be greater than the angle opposite the less.

6. To a given straight line, to apply a parallelogram which shall be equal to a given triangle, and have one of its angles equal to a given rectilineal angle.

7. In any right-angled triangle, the square which is described on the side subtending the right angle, is equal to the squares described on the sides containing the right angle.

8. If a straight line be bisected, and produced to any point, the rectangle contained by the whole line thus produced, and the part of it produced is equal to the square of the straight line, which is made up of the half and the part produced.

9. If a straight line be divided into any two parts, the squares of the whole line, and of one of the parts, are equal to twice the rectangle contained by the whole and that part, together with the square of the other part.

10. In obtuse-angled triangles, if a perpendicular be drawn from either of the acute angles to the opposite side produced; the square of the side subtending the acute angle is greater than the squares of the sides containing the acute angle, by twice the rectangle contained by the side on which, when produced, the perpendicular falls, and the straight line intercepted without the triangle between the perpendicular and the obtuse angle.

11. If two circles cut one another they shall not have the same center.

12. To draw a straight line from a given point, either without or in the circumference, which shall touch a given circle.

13. Upon a given straight line to describe a segment of a circle, which shall contain an angle equal to a given rectilineal angle.

EUCLID.

1. Define a plane superficies; an acute-angled triangle; a semicircle; parallel straight lines; and similar segments of a circle.

2. If two angles of a triangle be equal to each other, the sides also which subtend, or are opposite to, the equal angles, shall be equal to one another.

3. Draw a straight line at right angles to a given straight line, from a given point in the same.

4. Any two angles of a triangle are together less than two right angles.

5. Make a triangle of which the sides shall be equal to three given straight lines, but any two whatever of these must be greater than the third.

6. Parallelograms upon the same base, and between the same parallels, are equal to one another.

7. If the square described upon one of the sides of a triangle, be equal

to the squares described upon the other two sides of it; the angle contained by these two sides is a right angle.

8. If a straight line be divided into any two parts, the square of the whole line is equal to the squares of the two parts, together with twice the rectangle contained by the parts.

9. If a straight line be divided into two equal, and also into two unequal parts; the squares of the two unequal parts are together double of the square of half the line, and of the square of the line between the points of section.

10. To find the center of a given circle.

11. Equal straight lines in a circle are equally distant from the center; and conversely, those which are equally distant from the center, are equal to one another.

12. The diameter is the greatest straight line in a circle; and, of all others, that which is nearer to the center is always greater than one more remote: and the greater is nearer to the center than the less.

13. A segment of a circle being given, to describe the circle of which it is the segment.

MECHANICS.

1. Define a force. When is a force known? State the principle of the transmission of force. Is this a self-evident principle or not?

2. Enunciate the parallelogram of forces.

Assuming that it is true for the direction of the resultant, prove that it is true for the magnitude of the resultant.

3. If two parallel forces acting at given points of a straight lever, and in the same direction, keep the lever at rest; prove that the forces are inversely proportional to the distances of their points of application from the fulcrum.

Find also the pressure on the fulcrum.

One end of a poker rests on a smooth horizontal plane, and the other is supported by a string attached to it and fastened to a fixed point. Find the tension of the string, and the direction in which it will hang.

4. Enumerate the different kinds of levers, and give examples of each, pointing out in each case whether mechanical advantage is gained or lost.

5. A body is supported on a smooth inclined plane, by a force acting parallel to the plane; prove that the power is to the weight as the height of the plane to its length.

Find also the pressure on the plane.

Under what circumstances can the power, the weight, and the pressure on the plane, be all equal to one another?

6. Describe the common balance, and state briefly what are the requisites of a good balance.

Describe the method of *double weighing* or any method by which the defects of a balance arising from inequality in the arms, can be completely obviated.

7. Find the condition of equilibrium in that system of pullies in which the strings are parallel and in which each pully hangs by a separate string.

8. A uniform heavy ladder rests with one extremity on a smooth horizontal plane, and the other on a smooth vertical wall, and is kept from slipping by a string attached to the bottom of the ladder and to a point in the horizontal plane, shew that the tension of the string is equal to $W\frac{a}{2b}$, where

W is the weight of the ladder, a the distance of the foot of the ladder from the wall, and b the distance of the top of the ladder from the ground.

9. Define the term center of gravity.

Explain the method of finding the center of gravity of a number of heavy particles situated at given points. Shew from your method that every system of heavy particles has only one center of gravity.

10. Find the center of gravity of a triangular lamina of uniform thickness and density.

Will the same point be also in general the center of gravity of the perimeter of the triangle?

11. If a body rest on a horizontal plane, shew that it will stand or fall according as the vertical line through its center of gravity falls within or without the base.

Construct a parallelogram, which shall just rest in equilibrium with one side resting on a horizontal plane.

12. Distinguish between stable and unstable equilibrium and give instances of each.

Shew that if any part be cut off from a sphere by a plane the sphere will rest in stable equilibrium on a horizontal plane on the convex surface.

ALGEBRA.

1. Add together $(a-2b)^2$, $a(a+2b-6c)$, $b(2a-4b-3c)$ and subtract the result from $(2a+b)(a-3c)$.

2. Prove the rules of signs in Multiplication, by investigating the form of the product of $a-b$ and $c-d$, in the case when $a>b$, and $c>d$.

3. The product of two expressions is

$$2x^2y^2+2x^2z^2+2y^2z^2-x^4-y^4-z^4,$$

and one of them is $x+y-z$; find the other.

4. Prove that the difference of the squares of a number composed of two digits, and of the number formed by inverting these digits, is equal to 99 times the difference of the squares of the digits.

5. Reduce to their simplest forms:

$$\frac{x+\cfrac{1}{a+\cfrac{1}{x}}}{a+\cfrac{1}{x+\cfrac{1}{a}}}, \quad \text{and} \quad \frac{x+\cfrac{b}{a+\cfrac{b}{x}}}{a+\cfrac{b}{x+\cfrac{b}{a}}},$$

and add together

$$\frac{a+b-c}{b-c}+\frac{a+b-c}{c-a}+\frac{a^2-b^2}{(b-c)(c-a)}-\frac{c}{a-b}.$$

6. Solve the equations:

(1) $\dfrac{x-2}{5}-\dfrac{\frac{1}{2}(x-1)-\frac{3}{4}(x-5)}{2}+\frac{5}{6}(2x-28)=\frac{17}{2}.$

(2) $\dfrac{2x-1}{2x+1}+\dfrac{x-2}{x+2}=\frac{32}{35}.$

(3) $4x-3y=1{\cdot}7.$
$10x-9y=-{\cdot}1.$

(4) $\dfrac{x}{a}+\dfrac{y}{b}=1.$
$\dfrac{x^2}{a}+\dfrac{y^3}{b}=\dfrac{ab}{a+b}.$

7. A rectangular room is 3 feet longer than it is broad, and is 10 feet high. If by adding 3 feet to the length, 3 feet to the breadth, and 2 feet to the height, the cubical content of the room is doubled, find the length and breadth of the room.

8. When are four quantities said to be proportional?

What value must be given to x in order that

$$x + 1 : 2x + 1 :: 3x - 1 : 2x + 8?$$

If $a : b :: b : c :: c : d$, prove that $a : c :: a^2 : b^2$, and $a : d :: a^3 : b^3$.

9. A and B run a race. A gives B a start of 100 yards and overtakes him in 4 minutes. Afterwards A gives B a start of 30 seconds and overtakes him in 7 minutes.

Supposing the rates of running to be uniform throughout, find the rates at which A and B ran.

Find also how many yards start, in addition to a start of 20 seconds, A must give B, that they may run a dead heat of a mile.

10. It is between 3 and 4 o'clock; find the two times when the hands include the angle of an equilateral triangle, and the interval between these times.

11. The Cambridge University Volunteer Rifle Corps can be formed into a hollow square 8 deep, and may also be formed into a hollow square 10 deep.

The front presented in the latter formation has 1 man less than the front in the former formation. Find the number of men in the corps.

Shew also that the corps may be formed into hollow squares respectively 1, 2, 3, 4, 5 and 6 men deep.

EUCLID, BOOKS IV. AND VI.

1. When is a rectilineal figure said to be inscribed in a circle?

Prove that any parallelogram inscribed in a circle must be rectangular.

2. When is a straight line said to be placed in a circle?

Prove that the diameter is the greatest straight line that can be placed in a circle.

3. Describe a circle about a given triangle.

4. Inscribe an equilateral and equiangular hexagon in a given circle.

5. What relation must exist between two quantities in respect to (1) kind and (2) magnitude, in order that a ratio may subsist between them?

When are four quantities said to be proportionals?

6. Define duplicate ratio. What ratio is the duplicate of 4 to 9?

7. If a straight line be drawn parallel to one of the sides of a triangle, it shall cut the other sides, or these produced, proportionally; and conversely, if the sides, or the sides produced, be cut proportionally, the straight line which joins the points of section shall be parallel to the remaining side of the triangle.

8. From a straight line cut off any part required.

Divide a straight line into three equal parts.

9. Find a mean proportional between two given straight lines.

10. Similar triangles are to one another in the duplicate ratio of their homologous sides.

In two similar triangles the ratio of the triangles is equal to the ratio of their sides. What is that ratio?

11. In right-angled triangles, the rectilineal figure described upon the side opposite to the right angle, is equal to the similar and similarly described figures upon the sides containing the right angle.

XENOPHON, ANABASIS, I. II.

TRANSLATE: lib. I. cap. IV., 4, 5.
1. Beginning, Ἐντεῦθεν ἐξελαύνει σταθμὸν ἕνα, κ.τ.λ.
Ending, τριάκοντα μυριάδας στρατιᾶς.
Translate: lib. II. cap. V. 29, 30.
2. Beginning, Ἐβούλετο δὲ καὶ ὁ Κλέαρχος, κ.τ.λ.
Ending, καὶ τῶν ἄλλων στρατιωτῶν ὡς διακόσιοι.
Parse, τείχη, ἐφειστήκεσαν, ἀποβιβάσειεν, ὕετο, ἰέναι, στρατιωτῶν.
Give the derivations of ἡλίβατοι, ἐκποδών, λοχαγός.
Decline ναῦς.
Give the date of the expedition of Cyrus.

XENOPHON, ANABASIS, I. II.

TRANSLATE: lib. I. cap. VII., 18—20.
1. Beginning, Ἐνταῦθα Κῦρος Σιλανὸν καλέσας τὸν Ἀμπρακιώτην, κ.τ.λ.
Ending, ἐπὶ ἁμαξῶν ἤγοντο καὶ ὑποζυγίων.
Translate: lib. II. cap. IV. 21—23.
2. Beginning, Ἀκούσας δὲ ταῦτα ὁ Κλέαρχος, κ.τ.λ.
Ending, ὡς οἱ φυλάττοντες ἀπήγγελλον.
Parse τρισχιλίους, μαχεῖται, ἡμερῶν, ἠμελημένος, ἤρετο.
Give the derivations of ἀληθεύσῃς, ἅρματος, ὑποζυγίων, διώρυχος, ἀποστροφή.

TERENCE'S ANDRIA.

I. TRANSLATE *into* ENGLISH: Act I., Sc. I., 110—126.
Beginning, So. Quid ais? SI. Redeo inde iratus, atque ægre ferens, etc.
Ending, Sine nunc meo me vivere interea modo.
1. *Diceret.* Explain the construction here.
2. Parse *illi, comperisse, cedo.* 3. Derive *sedulo.*
II. Translate *into* English: Act II., Sc. IV., 1—8.
Beginning, SI. Reviso quid agant, aut quid captent consilii, etc.
Ending, Unum esse verbum, si te dices ducere.
1. Parse and explain the words *Qui differat te.*
2. Conjugate *reviso*, and decline *solus.*

TERENCE'S ANDRIA.

I. TRANSLATE *into* ENGLISH: Act II., Sc. VI., 1—11.
Beginning, DAV. Hic nunc me credit aliquam sibi fallaciam, etc.
Ending, Etenim ipsus secum eam rem reputavit via.
1. Parse *restitisse, potin' es.*
2. Conjugate *desino.* 3. Derive *prorsus, sollicitudo.*
II. Translate *into* English: Act V., Sc. III., 11—24.
Beginning, PAM. Me miserum! SI. Hem! modone id demum sensti, Pamphile? etc.
Ending, Chreme? CH. At tandem dicat sine. SI. Age, dicat: sino.
1. Parse *aliquo pacto, mi pater, viceris.*
2. Derive and conjugate *macero, indigeo.*
3. Derive and explain the use of *imo, olim.*

GOSPEL OF ST. MARK.

1. EXPLAIN the meaning and derivation of the word Εὐαγγέλιον. State what you know of the author of this Gospel. With what circumstances does he open his narrative?

2. Translate: chap. ii. 1—5.
Beginning, Καὶ πάλιν εἰσῆλθεν εἰς Καπερναούμ δι' ἡμερῶν· κ.τ.λ.
Ending, ἀφέωνταί σου αἱ ἁμαρτίαι σου.
Parse χαλῶσι, προσεγγίσαι, ἀφέωνται.
3. Translate: chap. iv. 26—32.
Beginning, Καὶ ἔλεγεν, Οὕτως ἐστὶν ἡ βασιλεία τοῦ Θεοῦ, κ.τ.λ.
Ending, τὰ πετεινὰ τοῦ οὐμανοῦ κατασκηνοῖν.
Give the principal tenses of the following verbs: βλαστάνη, μηκύνηται, παραδῷ, ἀποστέλλει.
4. Translate: chap. viii. 27—30.
Beginning, Καὶ ἐξῆλθεν ὁ Ἰησοῦς καὶ οἱ μαθηταὶ αὐτοῦ, κ.τ.λ.
Ending, ἵνα μηδενὶ λέγωσι περὶ αὐτοῦ.
Compare this account with that given of the same occurrence by any other Evangelist.
Derive Ἰησοῦς, μαθητής, Βαπτιστής, Πετρός, Χριστός.
5. Parse the following words: ἥψατο, ἀφῆκεν, ἔγειραι, σταθῆναι, ἑστῶτες, πεφίμωσο.
6. Give a short account of the Apostle St. John.

GOSPEL OF ST. MARK.

1. Write a list of the principal miracles performed by our Lord during His ministry.
2. Translate: chap. iv. 35—39.
Beginning, Καὶ λέγει αὐτοῖς ἐν ἐκείνῃ τῇ ἡμέρᾳ, ὀψίας γενομένης· κ.τ.λ.
Ending, καί ἐγένετο γαλήνη μεγάλη.
Decline μεγαλή, λαίλαψ.
3. Translate: chap. v. 25—29.
Beginning, Καὶ γυνή τις οὖσα εν ῥύσει αἵματος ἔτη δωδεκα, κ.τ.λ.
Ending, ὅτι ἴαται ἀπὸ τῆς μάστιγος.
Give the sequel of the story. Parse ἥψατο, ἴαται, παθοῦσα.
4. Translate: chap. ix. 21—27.
Beginning, Καὶ ἐπηρώτησε τὸν πατέρα αὐτοῦ, κ.τ.λ.
Ending, τῆς χειρὸς, ἤγειρεν αὐτὸν, καὶ ἀνέστη.
Explain the construction εἶπεν αὐτῷ, τὸ, εἰ δυνάσαι.
5. What references do we find to Elijah in this Gospel?
6. Give a short account of each of the Apostles Peter, James, and John; mentioning the occasions on which our Lord conferred any mark of distinction on them together, or individually.

EXAMINED AND APPROVED.

Agassiz	Joh.	Hopkins	Emm.	Sex	Down.
Bagnall	Sid.	Hornby	Trin. H.	Simcox	Joh.
Becher	Trin.	Lewthwaite	Trin.	Steward, A. H.	Joh.
Carlyon	Emm.	Muscroft	Christ's	Stuart	Caius
Casey, W. H.	Trin.	Onslow	Trin.	Walker	Trin.
Collings, H. W.	Trin.	Rogers, J. J.	Queens'	Wallis, W. M.	Joh.
Hodgson	Pet.	Rudge	Corpus	Warmington	Joh.
Hole	Christ's				

EXAMINED IN THE ADDITIONAL SUBJECTS AND APPROVED.

Devey	Joh.	Marsden	Queens'	Sturges	Emm.
Fullarton	Queens'	Philipson	Caius	Tilston	Trin. H.
Hopkins	Emm.	Poynder	Caius	Warmington	Joh.
Knox, A. B.	Trin.	Rudge	Corpus	Wharton	Queens'

EXAMINATION FOR B.A. DEGREE, NOVEMBER, 1860.

EXAMINERS:

Mathematical.	JAMES MOURANT DU PORT, M.A., *Caius College.* JOHN FULLER, B.D., *Emmanuel College.*
Classical.	ROBERT BURN, M.A., *Trinity College.* JOHN WILLIAM TAYLOR, M.A., *St. Peter's College.*
Acts of the Apostles and Reformation.	EDWARD HENRY ROGERS, M.A., *King's College.* JOHN SMYTH PURTON, B.D., *St. Catharine's College.*

CANDIDATES FOR B.A. DEGREE.

Arden, E. T.	Christ's	Holmes	Trin.	Pretyman	Trin.
Baker	Cath.	Johnson	Queens'	Rigby	Trin.
Baldock	Trin.	Kemp	Joh.	Rogers	Trin. H.
Barraclough	Trin.	Knapp	Emman.	Rowley	Magd.
Bennington	Joh.	Lock	Trin.	Roxby	Emman.
Bull	Joh.	Macdonald	Jes.	Sharpe, G. B.	Joh.
Chapman, J. J.	Emman.	Marsden, C. B.	Emman.	Sheffield	Trin. H.
Clay	Christ's	Marwood	Pemb.	Shilleto	Christ's
Curtois	Sid.	Nelson	Caius	Simpson	Cath.
Davies, R. H.	Trin.	Nottidge, W.	Emman.	Smith, O.	Trin.
Digby	Trin.	Ogden	Joh.	Steel	Trin.
Forster	Christ's	Parker	Trin.	Stephen	Cath.
Gordon	Trin.	Parr	Trin. H.	Tamplin	Trin.
Gunter	Joh.	Pemberton	Cath.	Turner, E. C.	Caius
Harrison	Caius	Pinney	Caius	Webber	Trin. H.
Hippisley	Trin.	Plaskitt	Joh.	Webster	Trin.
Hoare	Jes.	Powell	Clare		

EUCLID.

1. DEFINE a plane angle, a plane rectilineal angle, a circle, parallel straight lines.

In what case will two straight lines, which, when "produced ever so far both ways, do not meet," still not be parallel?

2. If at a point in a straight line two other straight lines upon the opposite sides of it, make the adjacent angles together equal to two right angles, these two straight lines shall be in one and the same straight line.

If on each of the sides of any equilateral triangle another equilateral triangle be described, shew that the four triangles will together form an equilateral triangle.

3. If a straight line falling upon two other straight lines makes the alternate angles equal to one another, these two straight lines shall be parallel.

4. If a side of any triangle be produced, the exterior angle is equal to the two interior and opposite angles; and the three interior angles of every triangle are equal to two right angles.

If from B, C, the extremities of the base of any triangle ABC, BE, CF be drawn respectively perpendicular to AC, AB, meeting in D, shew that the angle CDE is equal to the vertical angle of the triangle.

5. Parallelograms upon the same base, and between the same parallels, are equal to one another.

Upon a given base describe an isosceles triangle which shall be equal to the square described on the given base.

6. If a straight line be divided into any two parts, the rectangles contained by the whole and each of the parts, are together equal to the square of the whole line.

Express this proposition algebraically.

7. Describe a square that shall be equal to a given rectilineal figure.

8. Draw a straight line from a given point, either without or in the circumference, which shall touch a given circle.

Shew that a circle may be drawn through the four points in which the two circles in Euclid's figure are intersected by the straight lines used in his construction.

9. In a circle, the angle in a semicircle is a right angle; but the angle in a segment greater than a semicircle is less than a right angle; and the angle in a segment less than a semicircle is greater than a right angle.

10. Inscribe a circle in a given triangle.

11. If a point be taken in the base of a triangle such that the segments of the base have the same ratio which the adjacent sides of the triangle have to one another, shew that the line joining this point with the vertex shall bisect the vertical angle.

ACTS OF THE APOSTLES.

1. TRANSLATE: chap. iii. 11—19.

Beginning, *Κρατοῦντος δὲ τοῦ ἰαθέντος, κ.τ.λ.*

Ending, *ἀπὸ προσώπου τοῦ Κυρίου.*

Parse *ἰαθέντος, πεποιηκόσι, χαρισθῆναι.*

Explain *τὸν ἀρχηγὸν τῆς ζωῆς.*

2. Translate: chap. v. 33—40.

Beginning, *Οἱ δὲ ἀκούσαντες διεπρίοντο, κ.τ.λ.*

Ending, *καὶ ἀπελυσαν αὐτούς.*

λέγων εἶναί τινα ἑαυτόν. Where is this phrase used elsewhere in the Acts, and in St. Paul's Epistles?

Parse *ἀνῃρέθη, ἀπόστητε, ἐάσατε, ᾖ, δείραντες.*

What other mention have we of Gamaliel in the Acts?

3. Translate: chap. ix. 10—21.

Beginning, *Ἦν δέ τις μαθητὴς ἐν Δαμασκῷ ὀνόματι Ἀνανίας, κ.τ.λ.*

Ending, *ἐπὶ τοὺς ἀρχιερεῖς;*

Parse *ἀκήκοα, ᾖ, ἀπέσταλκέ.*

What account does St. Paul give of himself after the recovery of his sight?

4. Translate: chap. xviii. 1—11.

Beginning, *Μετὰ δὲ ταῦτα χωρισθεὶς ὁ Παῦλος ἐκ των Ἀθηνῶν, κ.τ.λ.*

Ending, *διδάσκων ἐν αὐτοῖς τὸν λόγον τοῦ Θεοῦ.*

Parse *διατεταχέναι.*

How does St. Paul mention elsewhere that he had baptized Crispus, and whom does he add besides as having been baptized by his own hand?

HERODOTUS. BOOK III.

1. WHERE was Herodotus born, and when did he live? What was the extent of his travels?

2. Translate: bk. III. cap. 6, 7.

Beginning, *Τὸ δὲ ὀλίγοι τῶν ἐς Αἴγυπτον ναυτιλλομένων ἐννενώκασι, κ.τ.λ.*

Ending, *πίστις δούς τε καὶ δεξάμενος παρ' αὐτοῦ.*

(*a*) Parse *ἐννενώκασι, σάξαντες, παρέλαβον, πυθόμενος.*

(*b*) Give the Attic Greek for *ἀναισιμοῦνται, ἐπιφοιτέων, ἀσφαλείης.*

(*c*) Derive *δήμαρχος, ἐαβολή.* Where was Memphis?

3. Translate: bk. III. cap. 41.
Beginning, Ταῦτα ἐπιλεξάμενος ὁ Πολυκράτης, κ.τ.λ.
Ending, ἀπικόμενος δὲ ἐς τὰ οἰκία, συμφορῇ ἐχρῆτο.
(*a*) Parse ἐπιλεξάμενος, ὑπετίθετο, ἀναγαγεῖν, ἀσηθείη.
(*b*) Derive κειμήλια.
(*c*) Relate the previous part of the story of Amasis and Polycrates.
4. Translate: bk. III. chap. 115, 116.
Beginning, Αὗται μέν νυν ἔν τε τῇ Ἀσίῃ ἐσχατιαί εἰσι καὶ ἐν τῇ Λιβύῃ, κ.τ.λ.
Ending, καὶ σπανιώτατα ἔχειν αὗται.
(*a*) Parse εἶπαι, οἴκασι, ποιηθέν.
(*b*) Κασσιτερίδες. What is the modern name of the district thus called by Herodotus? What river is probably meant by the Eridanus?
(*c*) Give the Attic Greek for περικλήϊουσαι, ἐνδέκομαι, ποιητέω.

MECHANICS AND HYDROSTATICS.

1. Define Force, and shew that forces in Statics may be completely represented by straight lines.

2. If two forces, acting perpendicularly on a straight lever in opposite directions, and on the same side of the fulcrum, balance each other, they are inversely as their distances from the fulcrum: and the pressure on the fulcrum is equal to the difference of the forces.

What are the conditions necessary in order that three forces acting perpendicularly on a straight rod without weight, may balance each other?

3. If two forces acting at a point are represented in direction and magnitude by two sides of a parallelogram, the diagonal through the point will represent their resultant in direction.

Having given the direction and magnitude of the resultant of two forces acting at a point, and also the direction of one and the magnitude of the other, find a geometrical construction for determining the magnitude of the one and the direction of the other force.

4. Investigate the conditions of equilibrium on the wheel and axle.

How does the thickness of the rope affect the mechanical advantage when a weight is raised by means of a windlass or similar contrivance?

5. If a body balance itself on a line in all positions, the center of gravity is in that line.

When is the equilibrium of a body said to be stable, and when unstable?

6. The pressure at any point of a fluid of uniform density is proportional to its depth below the surface of the fluid.

If a vessel of any form the bottom of which is horizontal, be filled with fluid, the pressure on the bottom is the same as though the sides were vertical.

7. If a body float on a fluid it displaces as much of the fluid as is equal in weight to the weight of the body: and it presses downwards and is pressed upwards with a force equal to the weight of the fluid displaced.

What further condition must be satisfied in order that the body may be in equilibrium?

8. Describe the common Hydrometer, and explain the method of employing it to compare the specific gravities of two fluids.

9. Explain the construction of the Common Barometer. Shew that the pressure of the atmosphere is accurately measured by the weight of the mercurial column.

If the level of the mercury in the cistern be at the zero point of graduation when the reading of the barometer is 30 inches, and the area of the horizontal section of the cistern $= n$ times that of the tube, determine the correction to be applied when the reading of the barometer is $30 \pm r$ inches.

10. Describe the construction of the common lifting-pump and its operation,

ALGEBRA.

1. Prove that $a^2 \times a^3 = a^5$.

Enunciate the general proposition of which this is a particular case.

2. Divide $4a^2b^2 + 2(3a^4 - 2b^4) - ab(5a^2 - 11b^2)$ by $3a^2 + 2ab - b^2$.

3. Simplify the following:

(1) $\dfrac{x^3 + 2x^2y + 2xy^2 + y^3}{(x+y)^2}$.

(2) $\left(\dfrac{x+y}{x-y} + \dfrac{x-y}{x+y}\right) \div \left(\dfrac{x+y}{x-y} - \dfrac{x-y}{x+y}\right)$.

4. Resolve $4(ab + cd)^2 - (a^2 + b^2 - c^2 - d^2)^2$ into four factors.

5. If a number be divided into any two parts, shew that the difference of the cubes of the parts, together with the product of the less part into the sum of the squares of the parts, is equal to the product of the other part into the difference of the squares of the parts, together with the continued product of the number and the two parts.

6. Solve the following equations:

(1) $\dfrac{2x-3}{3x-4} = \dfrac{4x-5}{6x-7}$.

(2) $x + \dfrac{1}{x-3} = 5$.

(3) $\dfrac{3}{x} + \dfrac{2}{y} = 1, \quad \dfrac{3}{y} + \dfrac{2}{x} = 1$.

(4) $x^2 - xy = 10, \quad xy - y^2 = 6$.

7. When are four algebraical quantities said to be proportional? If a, b, c, d satisfy your definition, shew that

$$a^2 + 3ab + b^2 : b^2 :: c^2 + 3cd + d^2 : d^2.$$

8. A person who is travelling eastwards at the rate of 3 degrees a day has a watch which loses half a minute a day, how far has he travelled when his watch seems to be 50 minutes too slow?

N.B. A watch which is carried eastwards appears to lose one hour for every 15 degrees.

9. At a rifle-match the winner's score was four times the difference between his score and the greatest number of points that could be won, and the sum of his score and the greatest number of points was equal to the square of the same difference; what was the winner's score, and what the greatest number of points?

JUVENAL, SATIRES III. AND X.

1. Translate the following passages:

(a) Quosdam præcipitat subjecta potentia magnæ
Invidiæ.

What instances does Juvenal adduce in support of this assertion?

(b) Carus erit Verri, qui Verrem tempore quo vult
Accusare potest.

What were the principal charges brought against Verres? By whom was he defended?

(c) Ergo supervacua hæc aut perniciosa petuntur,
Propter quæ fas est genua incerare Deorum.

Compare this passage with

Ἀλλ' ἤτοι μὲν ταῦτα θεῶν ἐν γούνασι κεῖται,—*Il.* P. 514.

and Ἀλλ' εἰς θεοὺς χρὴ ταῦτ' ἀναρτήσαντ' ἔχειν.—Eur. *Phœn.* 717.

Is the same custom alluded to in each of these passages?

(*d*) Divitis hic servi claudit latus ingenuorum
Filius: alter enim, quantum in legione tribuni
Accipiunt, donat Calvinæ vel Catienæ.

Explain the expression "claudit latus." When was pay first granted to Roman soldiers? What proportion was assigned to a tribune?

(*e*) Sic libitum vano, qui nos distinxit Othoni.

Give the date of the introduction of this law of Otho. What was the distinction drawn in it?

(*f*) præstare tributa clientes
Cogimur, et cultis augere peculia servis.

What was the relation between the Cliens and Patronus in the earlier days of Rome? How were these relations subsequently modified?

(*g*) Quid Crassos, quid Pompeios evertit, et illum,
Ad sua qui domitos deduxit flagra Quirites?

What is the date of the 1st Triumvirate? How was this connexion severed? Derive Quirites.

(*h*) sed ille
Cannarum vindex ac tanti sanguinis ultor,
Annulus. I, demens, et sævas curre per Alpes,
Ut pueris placeas, et declamatio fias.

Explain the several allusions in this passage.

2. Translate: Sat. III., 171—184.

(A) Beginning, Pars magna Italiæ est, si verum admittimus, in qua, etc.
Ending, Paupertate omnes. Quid te moror? Omnia Romæ Cum pretio.

Translate: Sat. x., 65—81.

(B) Beginning, Pone domi lauros, duc in Capitolia magnum, etc.
Ending, Continet, atque duas tantum res anxius optat, Panem et Circenses.

HISTORY OF THE ENGLISH REFORMATION.

1. State the nature and extent of the Papal Supremacy in England at the beginning of the reign of Henry VIII. Give a brief account of the measures by which it was superseded in his reign. How far did the royal supremacy take its place?

2. Describe the contents of the Act of Six Articles, and the circumstances which gave rise to it.

3. Enumerate the Sacraments of the Church of Rome. What course did the English Reformers pursue with respect to them? How did they define a Sacrament?

4. Give some account of the principal German Reformers who were consulted by the English divines in the reign of Edward VI.

5. State the principal facts in the lives of Sir T. More, Latimer, and Jewell. Name some of their works.

6. Who were the chief martyrs in the persecution under Queen Mary? State particulars respecting the death of Cranmer.

7. Mention the principal points of difference between the first and second Prayer Books of King Edward VI. Give their dates.

8. What were the Lambeth Articles? With what view, and under what circumstances were they framed?

9. Relate the events which induced Hooker to write his 'Ecclesiastical Polity.' Mention other works of similar character published in the same reign.

10. Give some account of the Hampton Court Conference. What was its result?

LAW DEGREE EXAMINATION, DECEMBER, 1860.

EXAMINERS:

J. T. ABDY, LL.D., *Trinity Hall.*
JOSEPH SHARPE, LL.D., *Jesus College.*
HERBERT BROOM, M.A., *Trinity College.*
C. S. CALVERLEY, M.A., *Christ's College.*

ROMAN LAW.

1. GIVE the definition of Jus Gentium contained in the Institutes. Is there any distinction between the Jus Gentium of the Civil Law and Modern International Law?

2. Was a child born of a free father and a slave mother free by the Roman Law? What was the rule of the English Law as to the children of a free father and a villein mother? Shew what was the effect of the English rule with respect to the extirpation of Villenage.

3. Define 'Dos,' and state the rights of the husband thereto.

4. What was the 'Jus Postliminii'? Give an instance of its application to Modern Law.

5. Enumerate the kinds of Capitis diminutio, and describe the effect of each. Explain the term Caput in the Roman Law.

6. State what were the duties of the Tutor and Curator respectively. When and how did their duties cease?

7. In whom is the property in the sea shore vested by the Roman and English Law? Have private persons any rights in the sea shore by either system of law?

8. Define Servitudes, and give their principal divisions with examples of each kind. Explain 'iter,' 'actus', 'via,' and 'aquæductus.'

9 What was Usucapio, and to what did it extend? State the alterations which were made by Justinian in the law by which the fact of possession was converted into the right of ownership.

10. What were the various kinds of Roman Testaments? Give the formalities requisite to the validity of each.

11. Enumerate the principal persons who were incapacitated from making Testaments.

12. By what means might a Testament be either 'ruptum' or 'irritum'? Explain the distinction between 'ruptum' and 'irritum.'

DIGEST. BOOK I. TIT. II.

TRANSLATE:

Beginning, Facturus legum vetustarum interpretationem, etc.
Ending, Sed communi nomine appellatur jus civile.
Beginning, Deinde quum esset in civitate lex duodecim tabularum et jus civile, etc.
Ending, Honorarium dicitur, quod ab honore Prætoris venerat.
Beginning, Capta deinde Sardinia, mox Sicilia, etc.
Ending, Postea ædiles senatusconsulto crcabantur.

1. What were the 'actiones legis'? Who was Cnæus Flavius, and what had he to do with them? Was any sddition made to them by another person afterwards?

2. How many Prætors were there at the first establishment of the office, and why was the number increased?

JUSTINIAN'S INSTITUTES. Books I. II.

I. Translate, explaining briefly "dedititios"; "Latinos"; Junianos"; and "multis modis additis."

1. Beginning, Et dedititios quidem per constitutionem nostram expulimus, etc.
Ending, quæ sola est in præsenti, præstari.—Book I. tit. v. 3.

What were the provisions of the Lex Julia Norbana? Which one is referred to when Justinian says, "In ipso ultimo spiritu animam simul et libertatem amittebant"?

2. Beginning, Non tamen cuicumque volenti manumittere licet, etc.
Ending, qualibet ex causa heres non extiterit.—Book I. tit. vi. 1.

Explain briefly "in fraudem creditorum manumittit"; "heres;" "necessarius."

3. Beginning, Sed hodie, ex nostra constitutione, etc.
Ending, causa cognita adrogatio permittitur.—Book I. tit. xii. 2.

On what principle were women unable to adopt? Explain briefly "personam", and "adrogatio."

4. Beginning, Sed et servus proprius testamento, etc.
Ending, Proprius autem servus inutiliter eo modo tutor datur.—Book I. tit. xiv. 1.

To what is "libertatem *directam*" opposed?

5. Beginning, Quod autem lex ab intestato vocat ad tutelam adgnatos, etc.
Ending, cum is qui datus est tutor, vivo testatore decesserit.—Book I. tit. xvi. 2.

To support what principle did the law step in in this case?

6. *Et qui potestatem habent aliquam*, se excusare possunt [a tutela].
Book I. tit. xxv. 3.

What other excuses were allowed? Explain briefly the Italicized words.

7. Beginning, Si tamen alienam purpuram vestimento suo quis intexuit,
Ending, et quibusdam aliis possessoribus possunt.—Book II. tit. i. 26.

Explain briefly "vindicari" and "condici."

8. Denique et si in adrogationem datus fuerit miles, vel filiusfamilias emancipatus est, testamentum ejus quasi ex nova militis voluntate valet, nec videtur capitis deminutione irritum fieri.—Book II. tit. xi. 5.

Mention some of the soldier's testamentary privileges.

9. Beginning, Hereditas plerumque dividitur in duodecim uncias, etc.
Ending, suam hereditatem dividere.—Book II. tit. xiv. 5.

10. Beginning, Si peculium legatum fuerit, etc.
Ending, et ex eo reliqua inferre.—Book II. tit. xx. 20.

Explain briefly "peculium."

II. Compare *usus* with *ususfructus*, *legatum* with '*legacy*'; and explain briefly the following phrases: *servus pœnæ, statu liber; semel heres semper heres; servitus servitutis esse non potest.*

WARREN'S BLACKSTONE.

1. Define "Municipal Law." And state the ordinary twofold division of it adopted by English lawyers.

2. Specify various general customs which obtain in this country, and have the force of law.

3. Which is the oldest of our Statutes now operative?

4. What, according to Blackstone, are the "constituent parts of a Parliament"?

5. What is meant by "allodial" land? Is there any such in England?

6. "Fraud will vitiate everything." Illustrate this proposition.

7. What was sought to be affected by Mr Fox's Libel Act? Was this statute declaratory or enacting?

8. Distinguish between libel and slander, and between slander actionable per se and slander actionable on proof of special damage.

9. What are the three ingredients in a valid contract? And in what does a contract differ from a tort?

10. Explain shortly the policy of the legislature in enacting the Statute of Frauds, (29 Car. II. c. 3).

11. How may murder be distinguished from manslaughter?

Put instances of homicide not felonious.

12. "Actus non facit reum, nisi mens sit rea," put various states of facts illustrating this maxim.

13. Mention the Three Superior Courts of Common Law and Courts having Appellate Jurisdiction in common law cases.

HALLAM'S CONSTITUTIONAL HISTORY.

1. What was the dispensing power claimed by the sovereigns of England? and how far was it consistent with the ancient law?

2. State briefly the principal resolutions which were passed in the Convention Parliament prior to the presentation of the Bill of Rights.

3. What were the principal provisions in the Bill of Rights? and state the points in which it differed from the Declaration of Rights.

4. By what proceeding was the punishment of Sir John Fenwick effected, and in what respects did it contravene the ordinary course of the law?

5. By what means is this country secured from the abuse of military power?

6. What were constructive treasons? Give examples, and state the arguments applicable to each.

7. What alterations were made in the law of treason during the reign of William the Third?

8. How was the liberty of the Press secured during the reigns of William the Third and his successors?

9. State what Acts were passed during the reigns of William the Third against, and in favour of, toleration in religion.

10. On what occasion and when was the Act of Settlement passed? What were its principal provisions?

11. What was the proceeding against Sacheverell, its cause, and its result? Give an analysis of the chief arguments for and against his prosecution.

12. What was the war of the succession? Shortly describe the negociations for pacification, and give the reasons for and against the peace of Utrecht.

13. State briefly the causes which led to the diminution of the personal authority of the crown.

ROMAN LAW.

1. Translate the following passage of Gaius:

Constant autem jura ex legibus plebiscitis senatus consultis constitutionibus Principum, edictis eorum qui jus edicendi habent responsis prudentium.

Define the sources of the Civil Law enumerated in the above passage. What was the 'Jus edicendi' and who possessed it? Whence was the obligatory force of the 'Constitutiones Principum' derived?

2. What was the contract of 'emptio et venditio'? What were the remedies, by each party, by the Roman and English system of laws, for

a breach of such contract respecting a chattel, and what could be recovered in an action for breach of such contract?

3. Si quis a non domino quem dominum esse crediderit, bona fide fundum emerit, vel ex donatione aliave qualibet justa causa æque bona fide acceperit, naturali ratione placuit fructus quos percepit, ejus esse pro cultura et cura; et ideo si postea dominus supervenerit, et fundum vindicet, de fructibus ab eo consumptis agere non potest.

Does the doctrine asserted in the text accord with the English law? In what cases, according to the latter system of law, can the lawful owner recover the profits which have accrued to the holder, and by what means?

4. Define 'Traditio.' What were the requisites to its validity, and to what did it extend? Does the similar proceeding in the English Law have an equally extensive effect?

5. What was the 'longi temporis possessio'? To which of the following cases does it extend? and give your reasons for your opinion.

(1) Immoveables taken by violence in the possession of original wrongdoer.

(2) Immoveables taken by violence in the hands of a bona fide possessor.

(3) Things stolen in the hands of a bona fide purchaser without notice.

(4) Immoveables taken through the absence or negligence of real owner and conveyed to a bona fide possessor.

6. What are the periods of time after which no action can be brought by the law of England for the recovery of lands and goods respectively? Apply the English law to the cases stated in the last question.

7. Describe briefly the principal proceedings in a Roman action during the reign of Justinian.

8. What is the meaning of an Issue in an English action at law? By what means were issues arrived at, both by the Roman and English systems? Give examples, and state who were the persons to try such issues.

9. Define 'damnum infectum.' What were the measures provided by the Roman Law against 'damnum infectum'?

A's house adjoins and is supported by *B*'s house; *B* allows his house to become in disrepair, whereby it is probable that within a short time it will fall down and *A*'s house with it.

Has *A* any remedy in Roman or English Law to compel *B* to repair his house?

10. What were the various forms of marriage, and by what modes and for what causes might marriage be dissolved?

11. Between what relations were marriages prohibited by the Civil Law? How were the degrees of relationship computed?

12. State the various modes by which illegitimate children might be legitimatised. Are any of those modes allowed by the English Law?

DIGEST. Book XXX. Tit. I.

Translate, adding any such brief notes as may be necessary:

Beginning, Quod in rerum natura adhuc non sit, etc.
Ending, nihilominus recte a legatario vindicabitur.
Beginning, Plane ubi transferre voluit legatum in novissimum, etc.
Ending, utputa si Titio et servo proprio sine libertate.
Beginning, Quæsitum est: si filiusfamilias qui filium habebat, etc.
Ending, si alienatus a testatore fuisset, legatum ad emtorem pertinebit.
Beginning, Ab omnibus heredibus legatum ita erat, etc.
Ending, quod unusquisque et sibi et coheredi suo dare damnatus videretur.

1. A testator leaves a horse to *B* imagining it to be his own: it turns

out however to belong to *C*. Would this legacy be valid? Would it be valid if the testator at the time of the legacy knew that it was C's? Give your reasons for each answer.

2. How does a Modus differ from a Condition?

3. Explain briefly the terms 'dies cedit' and 'dies venit' with reference to legacies.

JUSTINIAN'S INSTITUTES, BOOK II. GAIUS'S COMMENTARIES, BOOKS I. II.

I. TRANSLATE:

1. Beginning, Finitur autem ususfructus morte fructuarii, etc.
   Ending, quæ res consolidato appellatur.—*Inst.* tit. IV. 3.

On what principle was the usufruct extinguished by 'consolidatio'?

2. Beginning, Denique et si in adrogationem datus fuerit miles, etc.
   Ending, nec videtur capitis deminutione irritum fieri.—*Inst.* tit. XI. 5.

Mention some of the testamentary privileges accorded to soldiers.

3. Beginning, Hereditas plerumque dividitur in duodecim uncias, etc.
   Ending, suam hereditatem dividere.—*Inst.* tit. XIV. 5.

What would be the effect of a testator assigning definite parts to some of his heirs and not to others?

4. Sed si instituto heredi et coheredi suo substituto dato alius substitutus fuerit, divi Severus et Antoninus sine distinctione rescripserunt ad utramque partem substitutum admitti.—*Inst.* tit. XV. 3.

5. Beginning, Si peculium legatum fuerit, etc.
   Ending, et ex eo reliqua inferre.—*Inst.* tit. XX. 20.

II. Explain the phrase "nulli res sua servit," and give the meaning, and probable origin, of the term "suus heres."

III. What were the objects of the "Lex Falcidia," and of the "senatusconsultum Trebellianum"?

Translate:

1. Beginning, Non tamen cuicumque volenti manu mittere licet, etc.
   Ending, quam si vindicta aput consilium justa causa manu missionis adprobata fuerit.—*Comm.* book I. 36.

Compare the term 'legatum' with our 'legacy.'

2. Beginning, Item si quis per populum, etc.
   Ending, set etiam liberi ejus in ejusdem fiunt potestate tanquam nepotes.—*Comm.* book I. 105—107.

How did children escape *de patria potestate?*

3. Beginning, Sed jura prædiorum urbanorum in jure tantum cedi possunt; etc.
   Ending, et in jure cessionem recipiunt.—*Comm.* book II. 29—31.

How does 'usus' differ from 'ususfructus'? What are *stipendiaria, tributaria prædia?*

4. Beginning, Idem contingit et in frumento quod in solo nostro ab aliquo satum fuerit, etc.
   Ending, utique si bona fide possessor fueris.—*Comm.* book II. 76—78.

How did Justinian decide the question pending between the Proculeians and Sabinians? Explain "bonorum possessio."

5. Beginning, Item qui filium in potestate habet, etc.
   Ending, filia adcrescendo ex dimidia parte fit heres.—*Comm.* book II. 123, 124.

M. TULLIUS CICERO PRO CÆCINA.

TRANSLATE, explaining wherever necessary:

1. Beginning, Qui igitur convenit, etc.
   Ending, non quid actum sit, quærere.—cap. 3.

Explain what modes of proceeding were open to Cæcina.

2. Beginning, Huic Cæsenniæ fundum in agro Tarquiniensi, etc.
   Ending, Sed hunc fructum mature fortuna ademit.—cap. 4.
3. Beginning, His rebus ita gestis, P. Dolabella prætor interdixit, etc.
   Ending, sed etiam profiteri videatur, recuperatores?—cap. 8, 9.

Why may the interdict *de vi armata* have been preferred in this case?

4. Beginning, In eum quid dicam, nisi id quod negare non possit? etc.
   Ending, sed ad explendam damnationem præsto fuisse.—cap. 10.
5. Beginning, Ego, quod mihi videretur, etc.
   Ending, sed id quod dicitur, valebit.—cap. 28.
6. Beginning, Lex usum auctoritatem fundi jubet esse biennium, etc.
   Ending, si velit, jumentum per M. Scauri Tusculanum.—cap. 19.

Explain the line of argument here, and the reason of its adoption.

7. Beginning, At est aliquando contra judicatum, etc.
   Ending, multisque peritissimis hominibus, auctoribus uteretur.—cap. 24.

What was the *cause* in question, and in support of what principle is it appealed to here?

8. Beginning, Ut vero jam, recuperatores, etc.
   Ending, Numera, quam multa in ista defensione falsa sint, Piso.—cap. 31.

Mention any of these alleged fallacies. Give any illustrations that occur of the maxim 'exceptio probat regulam.'

Explain *recuperatores, feciales; jure judicioque, jure mancipii:* and give corresponding Latin expressions to "vested right," "right of road," "statute law," "common law."

What is the meaning of Lucretius's line,

"Vitaque mancipio nulli datur, omnibus usu"?

BLACKSTONE, VOL. I. AND HAYNES.

1. EXPLAIN the nature of the remedies available to a subject against the Crown by our constitution.

2. In what cases may the maxim, "nullum tempus occurrit regi," be applicable (1) in civil, (2) in criminal proceedings?

3. Under what circumstances will a Writ of Habeas Corpus be an appropriate remedy? What is meant by suspending the Habeas Corpus Act? and how may this be done?

4. What was decided in the Case of Monopolies 11 Coke Rep. 85.

5. What is meant by a wife's "equity to a settlement"? And how did this privilege originate?

6. What degree of moral guilt attaches, in your opinion, to one who violates or acts counter to the provisions of a statute passed in regard to a matter in itself indifferent?

7. Specify various classes of cases which are within the jurisdiction of Equity but excluded from that of a Court of Law.

8. In what respect does the province of a Judge in Equity essentially differ from that of a Common Law Judge?

9. What powers are derived from his Commission by a justice of the Peace?

10. Mention various incidents which attach to a corporation aggregate at common law.

11. What do you understand by the "lex et consuetudo parliamenti"? In what remarkable cases has this law been in conflict with the "lex terræ"?

12. What is the Mutiny Act? How frequently is it passed, and what, generally, is the nature of its provisions?

CONSTITUTIONAL HISTORY.

1. "SEPTENNIAL Parliaments were at first a direct usurpation of the rights of the people." (Priestley.) How does Priestley support this dictum? Is it true? Give a brief account of this bill, and the reasons for its introduction.

2. Lord Stanhope brought forward (A.D. 1718) "An act for strengthening the Protestant interest." What bill was this? What was its fate? On what other occasion was the attempt to carry out the same object renewed?

3. What was "the fable of Captain Jenkins's ears"? What political use was made of this story?

4. State briefly the arguments of Holt, L.C.J., in the case of Ashby *v.* White. What other important case of privilege was discussed some few years after this, and what was the opinion of the judges in this case?

5. Hallam asserts that Jacobitism with the majority was a modification of the spirit of liberty in the nation. Is this dictum in your opinion true? If so, how is it supported by the facts? If not, state your reasons for objecting to it.

6. What was the object of the Habeas Corpus Bill of 1758? What addition was made by it to the Act passed in the reign of Charles II.?

7. What was the "Family Compact"? Mention shortly its terms. What was the purport of the secret convention attached to it?

8. "Wilkes's case arose on the legality of *General Warrants.*" What case is here alluded to, and what was the result of the debate in the House of Commons on the subject above italicized?

9. Mention as many of the persons as you can remember to whom the letters of Junius have been attributed. State which of these names you prefer, and your reasons for the preference. What weight would you attach to the evidence of handwriting in the controversy about the authorship?

10. Give a short account of the political events that led to the American war of independence. What was the conduct of Lord Chatham and Mr. Grenville respectively at this crisis?

TRIAL OF JOHN WILKES.

1. STATE as nearly in the language of the original as you can the warrant of *commitment* in the information against Wilkes for the publication of No. 45 of the *North Briton.* What were the two objections raised to its *Legality?*

2. How were these objections overruled?

3. Taking the same facts, draw a warrant of commitment that would have brought the case within the terms of the second of these objections.

4. "The case of writing and publishing seditious libels has been resolved by both Houses not to be entitled to Privilege." (BLACKSTONE.)

Was this point raised in Wilkes's case? If so, what view was taken of it by the Court?

INTERNATIONAL LAW, AND TREATY OF AIX-LA-CHAPELLE.

1 In what respects is a treaty between two nations analogous to a contract between individuals?

2. In what relation does a treaty between two countries stand to International Law generally?

3. Shew by reference to history that the sanction of the legislative power in a state may be necessary for giving validity and efficacy to a treaty.

4 Specify various modes recognised in diplomacy, whereby the mission of a minister at a foreign court may, during his life, be terminated.

5. State shortly the effect of a declaration of war upon contracts existing between subjects of the belligerent powers. What effect has a declaration of war upon a partnership comprised of subjects of the two belligerents?

6. Upon what grounds were the works of art deposited in the Louvre during the wars of the French Revolution restored to the Countries from which they had been taken?

7. Explain what is meant by perfect and by imperfect neutrality. Give instances of the latter species of neutrality.

8. In whom, according to the theory of our Constitution, is vested the power of declaring war and of making peace? And how is the power practically limited?

9. Explain the cause of the war between Great Britain and Spain which commenced in the year 1739, and state when that war was terminated, and by what treaty.

10. Specify the principal powers engaged in the hostilities put an end to by the treaty of Aix-la-Chapelle.

11. What causes or events mainly induced the English Government to negotiate for peace A.D. 1748? Mention also the European powers which shewed themselves most disinclined to join in the negotiations, and state the reasons why they were averse to doing so.

12. Mention the more celebrated treaties on which that of Aix-la-Chapelle was hased.

13. Were the geographical boundaries of the principal states of Europe materially affected by the last-named treaty?

GENERAL PAPER.

(*a*) 1. What is a 'custom of the country' or 'local custom'? what efficacy has it? and what qualities are essential to its validity?

2. What advantages does a Court of Equity possess in dealing with fraud over a Court of Law, assuming the case sub judice to be within their concurrent jurisdiction?

(*b*) 1. War having broken out between two powers, is concluded by a treaty of peace. What is the effect of this treaty in regard to claims or rights in question between the contracting parties not specifically adjusted and settled by the treaty?

2. What are the privileges accorded to a public minister or ambassador accredited to a foreign state during the period of his residence in the country to which he is accredited? What are the exceptions to the immunity thus extended?

(*c*) 1. Mention shortly the provisions of Mr. Grenville's Bill for regulating the trial of controverted elections? What part did the ministry of the day take in the debates?

2. *A* makes a speech in Parliament imputing improper conduct and motives to *B*, a private individual, and charging him with unprofessional and dishonest practices: *A* afterwards publishes his speech, and is indicted for a libel. Would this indictment hold on the objection that members of parliament are protected from all charges against them for anything said in the house.

(*d*) 1. Define *Caput, Persona.* How is the existence of *capitis deminutio* reconcileable with the principle "civitatem nemo unquam ullo populi jussu amittit invitus"?

2. Mention the weak points, if any exist, in Cæcina's case, and explain the way in which Cicero endeavours to counteract their effect.

(*e*) 1. What was an Interdictum under the Roman Law? Explain the proceedings in connection therewith, and shew how they differed from those in an Actio.

2. What was the law of Accessio among the Romans?

A paints a picture of great value upon the canvas of *B*, *A* being at the time ignorant of the fact that the canvas is *B*'s property. To whom, by English and Roman Law, does the picture belong?

HONOURS.

FIRST CLASS.			SECOND CLASS.		THIRD CLASS.	
Bayford,	*Æq.*	Trin. H.	Bignold,	Trin. H.	Goddard,	Trin. H.
Harter,		Trinity	Trench,	Trinity	Wilkinson,	Jesus
Buszard		Trinity	Boult,	Trinity		

EXAMINED AND APPROVED.

Hartley,	St. John's	MacLeod,	Trin. Hall
Janvrin,	Caius	Williams, H.	St. John's

EXAMINATION FOR B.A. DEGREE, JANUARY, 1861.

MODERATORS:

PERCIVAL FROST, M.A., *St. John's College.*
AUGUSTUS VAUGHTON HADLEY, M.A., *St. John's College.*

EXAMINERS:

HENRY WILLIAM WATSON, M.A., *Trinity College.*
EDWARD JOHN ROUTH, M.A., *St. Peter's College.*

CANDIDATES FOR MATHEMATICAL HONOURS.

Abbott	Joh.	Budd	Pemb.	Dalton	Caius
Airy	Trin.	Bull	Queens'	Davies, T. C.	Trin.
Aldis	Trin.	Burney	Trin.	Dodd	Trin.
Allen, E. H.	Trin.	Bushell	Joh.	Dover	Jesus
Armitage	Emm.	Channell	Trin.	Edwards	Emm.
Bagge	Trin.	Cheyne	Joh.	Edwards, T. J.	Trin.
Barclay	Trin.	Churchill	Joh.	Fawcett	Trin. H.
Bechaux	Sidney	Clarence	Trin.	Finlaison	Jesus
Bond, J.	Magd.	Cole	Christ's	Flather	Joh.
Boys	King's	Cooke	Joh.	Foster	Joh.
Bradley	Caius	Copestake	Christ's	Francis	Joh.
Buckley	Joh.	Corrie, J. O.	Trin.	Freeman	Joh.

Gabb	Joh.	Maclachlan	Trin.	Smart	Joh.
Griffith	Emm.	McDowell	Pemb.	Smith, G.	Clare
Harwood	Trin. H.	Mathews, A.D.	Joh.	Sweeting	Trin.
Hawkins	Joh.	Mozley	King's	Tanner	Corpus
Heath	Trin. H.	Newton, W.	Joh.	Thelwall	Trin.
Hedges	Joh.	Pattrick, F.	Magd.	Thomas, E. L.	Trin.
Helt	Trin.	Peers, J. W.	Cath.	Thompson	Trin.
Hensley	Christ's	Pierpoint	Joh.	Thomson	Joh.
Hiern	Joh.	Quilter	Pet.	Thurlbourn	Emm.
Hoare	Joh.	Richmond	Pet.	Tillard	Joh.
Hornby	Pemb.	Rippin	Joh.	Tomlin	Caius
Hudson	Joh.	Robertson	Trin.	Townend	Trin.
Hughes, A. O.	Trin. H.	Romilly	Caius	Trench	Trin.
Hughes	Emm	Rouse	Trin.	Twentyman	Christ's
Hulbert, C. A.	Caius	Scriven	Joh.	Valentine	Joh.
Jones, J. B.	Trin.	Sharpe, H. J.	Joh.	Venn	Caius
Kitchener	Trin.	Shepherd, C. W.	Trin.	Warlow	Joh.
Lane	Trin.	Shuttleworth	Caius	Williams, L.	Joh.
Leach	Caius	Singleton	Pemb.	Wilson, W. S.	Joh.
Levin	Cath.	Skinner	Trin.	Wilson, W. R.	Trin.

EUCLID AND CONICS.

1. If a side of any triangle be produced, the exterior angle is equal to the two interior and opposite angles; and the three interior angles of every triangle are equal to two right angles.

If ABC be a triangle in which C is a right angle, shew how, by means of the first book, to draw a straight line parallel to a given straight line so as to be terminated by CA and CB and bisected by AB.

ii. In every triangle, the square of the side subtending any of the acute angles is less than the squares of the sides containing that angle, by twice the rectangle contained by either of these sides and the straight line intercepted between the perpendicular let fall upon it from the opposite angle and the acute angle.

If ABC be a triangle in which C is a right angle, and DE be drawn from a point D in AC at right angles to AB; prove, without using the third book, that the rectangles AB, AE and AC, AD will be equal.

3. If a straight line touch a circle, and from the point of contact a straight line be drawn cutting the circle, the angles made by this line with the line touching the circle shall be equal to the angles which are in the alternate segments of the circle.

Two circles intersect in A and B, and CBD is drawn perpendicular to AB to meet the circles in C and D; if EAF bisect either the interior or exterior angle between CA and DA, prove that the tangents to the circles at E and F intersect in a point on AB produced.

iv. Inscribe a circle in a given triangle.

Describe a circle touching the side BC of the triangle ABC and the other two sides produced, and prove that the distance between the points of contact of the side BC with the inscribed circle, and the latter circle is equal to the difference between the sides AB and AC.

5. If two triangles have one angle of the one equal to one angle of the other, and the sides about the equal angles proportionals, the triangles shall be equiangular, and shall have those angles equal which are opposite to the homologous sides.

From the angular points of a parallelogram $ABCD$ perpendiculars are drawn on the diagonals meeting them in E, F, G and H respectively; prove that $EFGH$ is a parallelogram similar to $ABCD$.

vi. Draw a straight line at right angles to a plane from a given point in the plane.

Prove that the shortest distance between two opposite edges of a regular tetrahedron is equal to half the diagonal of the square described on an edge.

vii. In the parabola prove that SY is a mean proportional between SA and SP.

PSp is a focal chord, and upon PS and pS as diameters circles are described; prove that the length of either of their common tangents is a mean proportional between AS and Pp.

8. In a parabola the rectangle contained by four times the focal distance SP and the abscissa PV is equal to the square on the semi-ordinate QV.

If AQ be a chord of a parabola through the vertex A, and QR be drawn perpendicular to AQ to meet the axis in R; prove that AR will be equal to the chord through the focus parallel to AQ.

ix. From the foci S and H of an ellipse SY and HZ are drawn at right angles to the tangent at P; prove that Y and Z are in the circumference of the circle whose diameter is the axis major.

If AQ be drawn from one of the vertices perpendicular to the tangent at any point P, prove that the locus of the point of intersection of PS and QA produced will be a circle.

10. If PN be an ordinate of the semi-axis major CA of an ellipse whose center is C, and if PT the tangent at P meet the axis produced in T, prove that $CN \cdot CT = CA^2$.

If Y, Z be the feet of the perpendiculars from the foci on the tangent at P; prove that the circle circumscribed about the triangle YNZ will pass through C.

11. If from a point P in an hyperbola straight lines PH, PK be drawn parallel to the asymptotes and meeting them in H and K respectively; prove that the rectangle contained by PH and PK will be invariable.

If the tangent at P meet one asymptote in T, and a line TQ be drawn parallel to the other asymptote to meet the curve in Q; prove that if PQ be joined and produced both ways to meet the asymptotes in R and R', RR' will be trisected at the points P and Q.

xii. A right cone is cut by a plane which meets the cone on both sides of the vertex; prove that the curve of intersection is an hyperbola.

If the curve formed by the intersection of any plane with a cone be projected upon a plane perpendicular to the axis; prove that the curve of projection will be a conic section having its focus at the point in which the axis meets the plane of projection.

ARITHMETIC, ALGEBRA, AND PLANE TRIGONOMETRY.

1. A PERSON having to pay £1045 two years hence invests a certain sum in the three per cent. consols, to accumulate interest until the debt shall be psid, and also an equal sum the next year. Supposing the investments to be made when consols are at 73, and the price to remain the same, what must be the sum invested on each occasion that there may be just sufficient to pay the debt at the proper time?

2. At the siege of Sebastopol it was found that a certain length of trench could be dug by the soldiers and navvies in 4 days, but that when only half the navvies were present, it required 7 days to dig the same

length of trench. Shew that the navvies did six times as much work as the soldiers.

3. Define x^m when m is an integer, and prove that $x^m . x^n = x^{m+n}$ where m and n are integers. Taking this equation as the definition of x^m when m has any value, deduce that $(x^m)^n = x^{mn}$.

Change the fraction $\dfrac{7 - 2\sqrt{(10)}}{\sqrt{\{7 - 2\sqrt{(10)}\}} + 5 - \sqrt{(10)}}$ into one in which the denominator is rational.

4. Define the arithmetical and geometrical means between two given numbers. Prove that no two unequal numbers can have their arithmetical and geometrical means equal.

If s be the sum of an odd number of terms of a series in geometrical progression, and s' the sum of the series when the signs of the alternate terms are changed; prove that the sum of the squares of the terms will be equal to $\pm ss'$ according as the signs of the odd or even terms be changed.

5. If α and β be the roots of $ax^2 + bx + c = 0$; prove that the equation whose roots are $\dfrac{\alpha}{\beta}$ and $\dfrac{\beta}{\alpha}$ will be

$$x^2 + \frac{2ac - b^2}{ac} x + 1 = 0.$$

Solve the equations:

$$(3x - 1)^2 + (4x - 2)^2 = (5x - 3)^2,$$
$$(x + a)\sqrt{(1 + x)} = 3(x - 1) + 2a,$$
$$\left.\begin{aligned} x^2 + y^2 + xy^2 + x^2y &= 4 \\ x^3 + y^3 &= 8 \end{aligned}\right\}.$$

6. Prove the Binomial Theorem for a positive integral index.

If a_r be the coefficient of x^r in the expansion of $(1 + x)^n$; prove that

$$a_0^2 - a_1^2 + a_2^2 - a_3^2 + \ldots = (-1)^{\frac{n}{2}} \frac{\lfloor n}{\left(\lfloor \frac{n}{2}\right)^2} \text{ or } 0,$$

according as n is an even or odd integer.

vii. Define the characteristic and mantissa of a logarithm. Investigate a rule for finding by inspection the characteristic of the logarithm of a number, which is either greater or less than unity.

Given that $\log 2 = \cdot 30103$, and $\log 3 = \cdot 4771213$, find the integral values between which x must lie in order that the integral part of $(1\cdot 08)^x$ may contain four digits.

viii. Define $\tan A$ for any value of A, and give the changes of sign and magnitude of $\tan A$ for values of A which change gradually from 90° to 270°.

Trace the changes of $\dfrac{\cos 2A}{\cos A}$ from $A = 0$ to $A = 180°$.

Give a geometrical construction for dividing an angle into two parts whose tangents shall be in a given ratio.

ix. Prove that $\tan A = \dfrac{1 - \cos 2A}{\sin 2A} = \pm\sqrt{\left(\dfrac{1 - \cos 2A}{1 + \cos 2A}\right)}$. Explain the double sign.

If $\tan A = \sqrt{(2)} + 1$, find $\cos 2A$ and thence the general value of A.

x. Prove that the tangents of $\frac{\pi}{3}$, $\frac{\pi}{4}$ and $\frac{\pi}{12}$ are in arithmetical progression.

If $A + B + C = 180°$, prove that $\dfrac{\tan\frac{A}{2}}{\tan\frac{C}{2}} = \dfrac{1 - \cos A + \cos B + \cos C}{1 - \cos C + \cos A + \cos B}$.

If $\sin(\alpha + \beta)\ \cos\gamma = \sin(\alpha + \gamma)\ \cos\beta$, prove that either $\beta - \gamma$ is a multiple of π, or α an odd multiple of $\frac{\pi}{2}$.

xi. Show how to solve a triangle by the use of logarithmic tables when two sides and the included angle are given. If $b = a\{\sqrt{(3)} - 1\}$ and $C = 30°$ find A and B.

If in a triangle the feet of the perpendiculars from two angles on the opposite sides be equally distant from the middle points of those sides, the other angle will be 60° or 120°, or else the triangle will be isosceles.

xii. Find the radius of the circle circumscribing a given triangle. Prove that if it be equal to the perpendicular drawn from one of the angles on the opposite side, the product of the sines of the angles adjacent to that side is $\frac{1}{2}$.

STATICS AND DYNAMICS.

1. Define the resultant of two forces; prove the parallelogram of forces so far as the *direction* of the reaultant is concerned, when the forces are commensurable.

If the parallelogram of forces be true for any two forces making a given angle with each other, prove that it will be also true for any two forces making any other angle with each other.

2. If three forces acting on a body be in equilibrium, prove that their lines of action will meet in a point and that each force will be proportional to the sine of the angle between the lines of action of the other two. Deduce from this proposition the conditions of equilibrium when the forces are parallel.

Two equal rods AB, AC without weight are connected by a hinge at A and are placed in a vertical plane resting on a smooth sphere so that the point A is vertically over the center O. A heavy ring slides on a string attached to the two ends B and C, the length of the string being twice that of either rod. If BD be the perpendicular drawn from B on AO produced, prove that in the position of equilibrium $AO.AD = 2.BD^2$, supposing the sphere to be so small that the string is clear of it.

iii. Investigate the distance of the center of gravity of any number of bodies from a given plane, in terms of the distances of the centers of gravity of the bodies from that plane.

Prove that the center of gravity of a triangle is the same as that of three equal particles placed at its angular points.

Perpendiculars are drawn from the angular points of a given triangle ABC upon the opposite sides, and another triangle is formed by joining the feet of these perpendiculars; prove that, if p, q, r be the distances of the center of gravity of this triangle from the sides opposite to A, B, and C,

$$\frac{p}{a^2\cos(B - C)} = \frac{q}{b^2\cos(C - A)} = \frac{r}{c^2\cos(A - B)}.$$

iv. Two given weights are connected by a string which passes over a pulley, one hangs freely and the other rests on a rough inclined plane,

find the directions of the string when the latter weight is in the highest and lowest positions consistent with equilibrium.

If the weights be such that when α is the inclination of the plane, λ the angle of friction, the inclinations of the string to the plane in the highest and lowest positions be ϵ and λ respectively, prove that

$$\tan^2 \frac{\epsilon + \lambda}{2} = \frac{\tan \lambda}{\tan \alpha}.$$

v. Explain the principle on which a measure of the sensibility of the Common Balance may be chosen; and find how the sensibility of a balance may be increased, without affecting the stability.

vi. In the system of pullies in which each pulley is suspended by a string attached to a fixed beam, the strings being parallel, prove that the principle of Virtual Velocities holds, if the weights of the pullies be neglected, and also if their weight be taken into account.

Prove also, that the same principle holds, and that the equilibrium is unstable, when two weights balance which are joined by a heavy string passing over the top of an inclined plane, one portion of the string resting on the plane and the other being vertical.

vii. State the Second Law of Motion.

Deduce from this law that it is correct in calculating the position of a projectile projected with a velocity v, to assert that the space traversed in the time t is $\frac{gt^2}{2}$ in a vertical direction, and vt in the direction of projection.

viii. Explain how Attwood's machine is employed to illustrate the third law of motion.

If, instead of allowing both weights to hang freely, one of them is moved by a single moveable pulley, the strings being parallel, find the acceleration of each weight.

If $P = Mf$ be the relation between the pressure, mass, acceleration, find the unit of time, when the unit of space is two feet, and the unit of pressure is the weight of an uuit of mass.

9. If a particle describe a parabola under the action of gravity, prove that the square of the velocity at any point of the orbit will be proportional to the distance of the particle from the focus.

If C be the center of curvature corresponding to any point P of the particle, prove that the vertical velocity of C will be proportional to the time elapsed since P was at the highest point of its orbit.

10. Two elastic balls moving in the same direction but with different velocities impinge directly upon one another, find their velocities after impact.

11. If a particle slide down a smooth curve in a vertical plane under the action of gravity, and if v, v' be the velocities of the particle at two points whose altitudes above any horizontal plane are y, y', prove that

$$v'^2 - v^2 = 2g(y' - y).$$

A smooth circular cylinder of given height h and whose radius is a is divided into two equal parts by a plane through the axis which is vertical, and one part is removed. A particle is projected horizontally with a given velocity from one extremity of the upper rim. Prove that the greatest possible velocity of projection in order that the particle may reach the ground before it leaves the semi-cylinder is $\pi a \sqrt{\left(\frac{g}{2h}\right)}$, and supposing the velocity greater than this, find the point where it will strike the ground.

12. Prove that the time of a complete oscillation of a particle in a smooth cycloid, whose axis is vertical, is $2\pi\sqrt{\left(\frac{a}{g}\right)}$, where a is the radius of curvature at the vertex.

A number of cycloids are drawn through a given point A and having their vertices situated on a given curve and their axes vertical. Prove that if the given curve be a cycloid whose vertex is at A and whose axis is vertical, the time of descent from A down all the cycloids to the given curve will be the same; and that whatever be the form of the given curve, the cycloid down which a particle will slide in the greatest or least time will have the tangent at A parallel to the tangent drawn to the given curve at the point where the cycloid meets it.

HYDROSTATICS AND OPTICS.

1. Prove that the difference of the fluid pressures at any two points within a vessel containing fluid of uniform density varies as the difference of the depths of the points below the surface.

How is this proposition modified if the vessel contains layers of uniform fluids of different densities which do not mix?

Three fluids whose densities are in Arithmetical Progression, fill a semicircular tube whose bounding diameter is horizontal. Prove that the depth of one of the common surfaces is double that of the other.

ii. Show how to find the resultant vertical pressure of a heavy homogeneous inelastic fluid upon any portion of the surface of a body immersed in it.

A double funnel formed by joining two equal hollow cones at their vertices stands upon a horizontal plane with the common axis vertical, and fluid is poured in until its surface bisects the axis of the upper cone. If the fluid be now on the point of escaping between the lower cone and the plane, prove that the weight of either cone is to that of the fluid it can hold as 27 : 16.

3. If a body be partially or totally immersed in a uniform fluid, show that the resultant fluid pressure on the body is equal to the weight of the fluid displaced, and acts vertically upwards through the center of gravity of the fluid displaced.

An equilateral triangle ABC, of weight W and specific gravity σ, is moveable about a hinge at A, and is in equilibrium when the angle C is immersed in water and the side AB is horizontal. It is then turned about A in its own plane until the whole of the side BC is in the water and horizontal; prove that the pressure on the hinge in this position

$$= 2\,\frac{1-\sqrt{(\sigma)}}{\sqrt{(\sigma)}}\,W.$$

iv. Explain the principle of the Diving Bell.

If a cylindrical diving bell, whose capacity is V cubic feet, be sunk to such a depth that the water stands at $\frac{1}{m}$th of its height, and be then lowered at the uniform rate of n feet per second, prove that the number of cubic feet of air at the atmospheric pressure which must be pumped in per second in order that the water may always remain at the same height will be $\left(1-\frac{1}{m}\right)\frac{n}{h}V$, where h is the height of the water-barometer in feet.

5. Explain the advantages of Smeaton's Air-pump, and find the density of the air in the receiver after n strokes of the piston.

If h be the range of the piston, α its distance from the top of the barrel in its highest position, β its distance from the bottom in its lowest position, and ρ the density of the atmosphere; prove that the limiting density of the air in the receiver will be $\frac{\alpha\beta}{(h+\alpha)(h+\beta)}\rho$.

vi. State the relation between the pressure, temperature and density of an elastic fluid; and the distinction between a permanent gas and a vapour.

A closed cylinder contains a piston moveable by means of a rod passing through an air-tight collar at the top of the cylinder. The piston is held at a distance from the bottom of the cylinder equal to one third of its height, and vapour is introduced above and below of a known pressure, the temperature of the cylinder being such as will support vapour of twice the density without condensation. The piston on being left to itself sinks through two ninths of the height of the cylinder. Prove that the weight of the piston is five fourths of the pressure of the vapour upon either side at first.

vii. Find the geometrical focus of a pencil of rays after direct refraction through a medium bounded by parallel planes.

If a pencil of light pass through any number of media bounded by parallel planes, and the velocity of light in any medium be assumed to be proportional to the refractive index of that medium; prove that the time actually occupied by the light, in reaching a point in any medium, will be the same as it would have taken to traverse in that medium a distance equal to the distance of the point in question from the geometrical focus corresponding to that medium.

viii. A luminous point is placed between two parallel plane mirrors. Find the law which the positions of the several images follow.

A luminous point is situated at the center of the base of a hollow perfectly reflecting vertical cylinder of very small radius, and a horizontal screen is held over the cyclinder at a height above its upper end which is half as great again as the height of the cylinder. Prove that a series of alternately darker and brighter rings is formed on the screen, the breadths of which are equal to the radius and diameter of the cylinder respectively.

9. Find the geometrical focus of a pencil of rays after direct refraction at the surface of a sphere.

If μ be the refractive index, r the radius, and μr the distance of the origin of light from the center, prove that the extreme incident rays on emergence intersect a screen, touching the sphere at the point opposite to the origin of light, in a circle, whose radius is

$$\frac{2-\mu}{2+\mu}\sqrt{\left(\frac{\mu+1}{\mu-1}\right)}r.$$

10. A pencil of light is refracted through a prism in a plane perpendicular to the edge, find the deviation of the axis.

A ray of light is incident upon one face of a prism, whose refracting angle i is less than 90°, in a direction perpendicular to the opposite face; prove that it will emerge at the opposite face if $\cot i > \cot\alpha - 1$, where α is the critical angle for the medium of which the prism is composed.

11. Determine the geometrical focus of a pencil of rays after direct refraction through a lens, the thickness of which is neglected.

The ends of a glass cylinder are worked into convex spherical surfaces whose radii are each equal to the length of the cylinder, prove that the geometrical focus of a pencil after direct refraction through the ends of

the cylinder is determined by the equation $\frac{\mu^2}{v} - \frac{1}{u} = -\frac{\mu^2 - 1}{r}$, where u and v are measured from the face nearest to the origin of light and r is the length of the cylinder.

xii. Describe the simplest form of the Astronomical Telescope, and trace the course of an oblique pencil to the eye of an observer. If the eye-glass be fitted in the extremity of a polished tube whose diameter and length are respectively equal to the diameter and focal length of the eye-glass, find the effect of the tube on the ragged edge when the stop is removed.

PROBLEMS.

1. The circles which touch the sides AC, BC of a triangle at C, and pass through B, A respectively, interaect AB in E and F. Lines drawn from the centers of the circles inscribed in the triangles ACF, BCE parallel to CF, CE, respectively, meet AC, BC in P, Q. Prove that CP is equal to CQ.

2. If x, y, z be real quantities, prove that

$$a^2(x-y)(x-z) + b^2(y-x)(y-z) + c^2(z-x)(z-y)$$

will always be positive provided that any two of the quantities a, b, c are together greater than the third.

3. A mixture of gold with n different metals contains r per cent. of gold and $r_1, r_2, r_3 \ldots r_n$ per cent. of the other metals. After repeated processes, by which portions of the other metals are taken away, the amount of gold remaining unaltered, the mixture contains s per cent. of gold and $s_1, s_2, s_3 \ldots s_n$ per cent. of the other metals. Find what per centage of each metal remains.

4. If ACB be a triangle having a right angle at C, and AE, BD drawn perpendicular to AB respectively, meet BC, AC produced in E and D, prove that $\tan CED = \tan^3 BAC$, and the triangle ECD is equal to the triangle ACB.

v. A beacon is due west of a lighthouse and three miles distant from it. The channel of a river is given by the condition that a vessel shall enter due south of the lighthouse, at such a point that the lighthouse and beacon shall subtend 60° at the vessel, and shall continue to do so until the beacon is north-west, when the channel remains straight in the last direction in which the vessel was sailing until it is due south of the beacon. Prove that the straight part of the channel is $\{\sqrt{(3)} + 1\}$ miles.

vi. Two parabolas have a common axis and vertex, and their concavities turned in opposite directions, the latus rectum of one is eight times that of the other; prove that the portion of a tangent to the former, intercepted between the common tangent and axis, is bisected by the latter.

vii. Tangents to an ellipse are drawn from any point in a circle through the foci, prove that the lines bisecting the angle between the tangents, all pass through a fixed point.

8. A sphere of radius a is supported on a rough inclined plane, for which the coefficient of friction is μ, by a string of length $\frac{a}{\mu}$, attached to it and to a point in the plane. Prove that the greatest possible elevation of the plane in order that the sphere may rest when the string is a tangent is $2\tan^{-1}\mu$; and find the tension of the string and the pressure on the plane in the limiting position of equilibrium.

9. The barrel of a rifle sighted to hit the center of the bull's eye, which is at the same height as the muzzle and distant a yards from it, would be inclined at an elevation α to the horizon. Prove that if the rifle be wrongly sighted so that the elevation is $\alpha + \theta$, θ being small compared

with α, the target will be hit at a height $\frac{\alpha \cos 2\alpha}{\cos^2 \alpha}\theta$ above the center of the bull's eye.

If the range be 960 yards, the time of flight 2 seconds, and the error of elevation 1″, the height above the center of the bull's eye at which the target will be hit will be nearly $\frac{1}{6}$th of an inch.

x. The portion of a right cone cut off by a plane will only just balance on a horizontal plane with the shortest side VA in contact; prove that the vertical through A in that position divides the opposite side VB in the ratio 3 : 2.

11. Three smooth, equal, and perfectly elastic spheres P, Q, R are situated on the circumference of a circle, R being equally distant from P and Q, but farther from each than they are from each other. If they be simultaneously projected with equal velocities towards the center, prove that R will just pass between P and Q without interruption.

xii. A ball of elasticity e is projected obliquely up an inclined plane so that the point of impact at the third time of striking the plane is in the same horizontal line as the point of projection. Prove that the distances from this line of the points of first and second impact, are in the ratio $1 : e$.

xiii. A straight line is drawn from the center of an ellipse meeting the ellipse in P, the circle on the major axis in Q, and the tangent at the vertex in T. Prove that as CT approaches and ultimately coincides with the semi-major axis, PT and QT are ultimately in the duplicate ratio of the axes.

14. The tangent at any point P in an ellipse, of which S and H are the foci, meets the axis-major in T, and TQR bisects HP in Q and meets SP in R; prove that PR is one fourth of the chord of curvature at P through S.

xv. Two particles are revolving in the same direction in an ellipse, under the action of a force tending to the focus. Prove that the direction of the motion of one as it appears to the other is parallel to the line bisecting the angle between their distances from the foci.

xvi. The sides of a rectangle are in the ratio $\pi : 4$, and semicircles are described on the longer sides as diameters. Prove that, if the rectangle be immersed in water, with one of the shorter sides in the surface, the pressure on the two parts external to both semicircles will together be equal to that on the part common to them.

17. A plane rectangular lamina is bent into the form of a cylindrical surface of which the transverse section is a rectangular hyperbola. If it be now immersed in water so that first the transverse, secondly the conjugate, axes of the hyperbolic sections be in the surface, prove that the horizontal pressure on any the same immersed surface will be in the two cases the same.

xviii. A hollow cylinder is closed at one end and open at the other, and a fixed stop perpendicular to the axis divides the cylinder into two equal parts cutting off the communication between the parts; the weight of the whole cylinder is half the weight of the water which it would contain. Prove that if the cylinder be placed mouth downwards in water the depth of the stop in the position of rest will be only half as great as if a hole had been made in the stop.

xix. Two hollow cones, filled with water, are connected together by a string attached to their vertices which passes over a fixed pulley; prove that, during the motion, if the weights of the cones be neglected, the total pressures on their bases will be always equal, whatever be the forms and dimensions of the cones. If the heights of the cones be h, h', and heights

mh, nh' be unoccupied by water, the total normal pressure on the base during the motion will always be in the ratio

$$n^2 + n + 1 : m^2 + m + 1.$$

xx. A refracting medium is worked into a prolate spheroid in which the axis is μ times the distance between the foci. Prove that if a ray be incident parallel to the axis, its deviation after emergence at the opposite side will be twice the angle which the normal at the point of emergence makes with the axis.

21. Two similar and similarly situated ellipses are traced on a plane such that the square on the distance between their centers is equal to the sum of the squares on the radius of each, drawn in the direction of the center of the other. A luminous point is placed at the center, and a convex lens at any point on the circumference, of one; prove that the image will lie on the circumference of the other if the principal focus does.

22. If the azimuth of a star at its rising be equal to the N.P.D. of the Sun at 6 A.M. to a spectator in 45° north latitude, prove that the declination of the star will be equal to the altitude of the Sun, and the hour angle of the star to the south azimuth of the Sun.

NEWTON AND ASTRONOMY.

1. Enunciate and prove Newton's first Lemma.

A and B are two fixed points, CD is a fixed straight line, and cd is another straight line moving subject to the condition that the rectangle under the perpendiculars upon it from A and B is equal to the rectangle under the corresponding perpendiculars upon CD. If the lines CD and cd intersect in P, prove that, ultimately, the angle APC will be equal to the angle BPD.

2. Enunciate and prove Newton's fourth Lemma.

Prove that the surface generated by the revolution of a semi-circle round its bounding diameter is to that generated by the revolution of the same semi-circle round the tangent at the extremity of the diameter in the ratio of the length of the diameter to the length of the semi-circle.

3. The vanishing subtenses of the angle of contact in all curves which have finite curvature at the point of contact are ultimately in the duplicate ratio of the chords of the conterminous arcs.

AB is an arc of finite curvature at A, and a point P is taken in it such that $AP : PB$ in the constant ratio of $m : n$. At A, P, and B tangents AT, TPR, and BR are drawn and AB is joined; find the ultimate ratio of the area $ATRB$ to the segment APB as B moves up to A, and prove that this ratio is a minimum and equal to 9 : 8 when P bisects AB.

4. When a body revolves in an orbit subject to the action of forces tending to a fixed point, the areas which it describes by radii drawn to the fixed center of force are in one fixed plane, and are proportional to the times of describing them.

A body is describing an ellipse round a center of force in one of the foci. Prove that the velocity of the point of intersection of the perpendicular from that focus upon the tangent at any point of the orbit is inversely proportional to the square upon the conjugate diameter.

v. A particle describes an ellipse with an acceleration tending to the center, prove that the acceleration is proportional to the distance.

If a triangle ABC be inscribed in the ellipse so that its center of gravity coincides with the center of the ellipse, prove that the velocities of the particle when at the angular points A, B, C will be proportional to the opposite sides of the triangle, and also that the times from A to B, B to C, and C to A will be equal to each other.

vi. A particle describes an oval orbit about a center of force S; when the particle is at any point P the center of force is suddenly removed to another point S'; determine the new law of force in order that the particle may continue to describe the same orbit as before. If T, T' be the periodic times before and after the change, and if SS' being produced meet the tangent at P in Q, prove that $T : T' :: S'Q : SQ$.

If the new center of force be so taken that the new law of force be always an integral power of the distance, prove that the locus of the centers of force about which the same oval orbit can be described will consist of a series of straight lines finite in length.

vii. Explain the changes in the length of the day which occur in the course of the year at a place within the arctic circle.

In what part of the heavens will a star be seen, whose right ascension is 30° and declination 0°, at six o'clock in the evening at midwinter? At what o'clock will the star set? Find also the sidereal time of the setting.

viii. What is the error of collimation in the transit instrument? Why is this error of more importance in this instrument than in the mural circle?

Explain how electro-magnetism is employed in making observations of the time of transit of a star.

ix. Shew how to determine the distance of the Moon from the Earth. Can the same method be applied to the Sun or any of the fixed stars? Obtain roughly the numerical value of the parallax of the Moon.

x. Explain the cause of aberration; and prove that all the stars are displaced by aberration towards the same point on the celestial sphere.

At what season of the year is the aberration of a star least whose right ascension is 90° and north declination 60°?

11. What are meant by the Lunar ecliptic limits? Shew how to find them.

If the orbits of the Moon and of the Earth be supposed to be each circular and in the same plane, investigate the effect of the finite velocity of light upon the real and apparent times of the beginning and ending, and upon the duration, of a lunar and solar eclipse respectively.

12. Explain the Moon's phases.

If on the day of one of the equinoxes the Moon be half full, prove that to a spectator at the equator, she will rise with the line bounding her visible disk horizontal.

NATURAL PHILOSOPHY.

1. Find the resultants of any number of forces acting upon a rigid body, and deduce sufficient conditions of equilibrium.

If P, Q be two forces whose directions are at right angles, prove that the distances of the central axis from their lines of action are as $P^2 : Q^2$.

2. Investigate the position of the center of gravity of an area, the boundaries of which are given by equations in polar co-ordinates.

Prove that the center of gravity of the arc of a Lemniscate whose equation is $r^2 = a^2 \cos 2\theta$ is in the line bisecting the angle between the lines drawn to the extremities of the arc from the node.

3. Investigate the equation of the curve in which a uniform string hangs from two fixed points under the action of gravity.

If a be the distance between the two points, a the inclination to the horizon of the line joining them, and l the length of the string, prove that, when $l-a$ is very small, the horizontal tension is equal to the weight of a portion of the string whose length is $\dfrac{a^2 \cos^2 a}{2\sqrt{(3)}\,\sqrt{(l^2-a^2)}}$.

iv. A particle of mass m moves in one plane under the action of forces,

whose resolved parts parallel to two fixed rectangular axes Ox and Oy, are X and Y respectively; prove the truth of the equations

$$\frac{d^2x}{dt^2} = \frac{X}{m}, \qquad \frac{d^2y}{dt^2} = \frac{Y}{m}.$$

If the axes of reference be moveable in the plane according to any law, and if θ and θ' be their respective inclinations at any instant to a line fixed in the plane, and v_x and v_y be the velocities of the particle at that instant resolved parallel to the axes, prove that

$$\frac{dv_x}{dt} - v_y \operatorname{cosec}(\theta' - \theta)\frac{d\theta'}{dt} - v_x \cot(\theta' - \theta)\frac{d\theta}{dt} = \frac{X}{m},$$

$$\frac{dv_y}{dt} + v_x \operatorname{cosec}(\theta' - \theta)\frac{d\theta}{dt} + v_y \cot(\theta' - \theta)\frac{d\theta'}{dt} = \frac{Y}{m}.$$

v. A particle is describing a curve under the action of forces tending to a fixed center. From this center a line is drawn representing the instantaneous velocity of the particle in direction and magnitude. Prove that the locus of the extremity of this line is the polar reciprocal of the curve described by the particle turned through a right angle.

If the polar equation of the original curve be of the form

$$p^2 = \frac{b^4}{r^2 - a^2},$$

where a and b are any constant quantities, prove that the extremity of the line drawn as above described will move with an acceleration which always tends to the center of force and is proportional to its distance from that center.

vi. A particle moves under the action of given forces in a very fine smooth tube of given form which revolves uniformly about an axis perpendicular to its plane. Investigate the equations for determining the motion of the particle.

An elastic string has one end attached to a point in the interior of a smooth circular tube, the circumference of which is equal to twice the natural length of the string. The string is then stretched completely round the tube, and a material particle is attached to the free end. If the tube be now made to revolve uniformly round an axis passing through the point of attachment of the string and perpendicular to the plane of the tube, find the velocity of the particle when the string has regained its natural length.

7. Find the couple which is required to keep a body, floating in a fluid, in a position inclined at a small angle to the position of equilibrium, a plane with respect to which the body is symmetrical being vertical.

If M be the metacenter, H, H' the centers of gravity of the fluid displaced in the position of equilibrium, and in the position of displacement through an angle θ, respectively, prove that the difference of distances of H and H' from the first plane of floatation is $\frac{1}{2} HM \cdot \theta^2$ very nearly.

viii. A flexible surface of any form is exposed to the action of fluid. Find the relation between the pressure, tensions, and curvature at any point.

If a flexible vessel in the form of a surface of revolution with its axis vertical contain heavy fluid at rest, prove that, generally, whenever the tension parallel to the meridian through any point is a maximum or minimum, it will be equal to the tension perpendicular to the meridian at that point.

9. Investigate the positions of the primary and secondary focal lines,

when a small pencil of light is obliquely refracted from a luminous point below the surface of still water.

How would a small white stone at the bottom of a piece of water appear to be coloured on a bright day? and what would be the effects on the appearance, if it were seen through a straight slit in a screen placed on the surface of the water, when the slit is in the vertical plane containing the eye and the stone, and when perpendicular to it, respectively?

x. Describe Flamstead's method of determining the position of the first point of Aries, and state the corrections to which the required observations must be subjected.

11. Shew how to find the time at any place, whose geographical situation is unknown, by observations of equal altitudes of a star before and after passing the meridian. What advantages has this method?

If the latitude of the place is known, and equal altitudes of the Sun are taken before and after noon, prove that the correction for the change of declination may be found from the formula $-A\mu \tan l + B\mu \tan \delta$, where A and B are independent of l and δ and may be tabulated for different intervals of time between the observations, μ being the change in the Sun's declination in 24 hours.

xii. Find the errors in right ascension and declination due to parallax.

PURE MATHEMATICS.

1. If p be a prime number and N be prime to p, then $N^{p-1} - 1$ is a multiple of p.

If ${}_pC_n$ denote the number of combinations of p things n together where p is a prime number, prove that ${}_{p-1}C_n + (-1)^{n-1}$ is divisible by p.

ii. If $u_x = ax + b$, prove that the sum of n terms of the series whose $(n+1)$th term is $\dfrac{a\kappa}{u_n u_{n+1} \ldots u_{n+\kappa}}$ where κ is a given quantity is

$$\frac{b + a\kappa}{b} \cdot \frac{1}{u_1 u_2 \ldots u_\kappa} - \frac{1}{u_n u_{n+1} \ldots u_{n+\kappa-1}}.$$

Why cannot this method be applied to determine the sum of the harmonic series $1 + \frac{1}{2} + \frac{1}{3} + \ldots$?

Prove that the sum of n terms of this harmonic series beginning at the nth becomes equal to log 2 when n increases without limit.

3. Solve the equation $x^n - 1 = 0$ where n is a positive integer, and shew that if n be a prime number, all the roots may be exhibited in a series of consecutive powers of any one of the imaginary roots.

What is the meaning of a primitive nth root of unity? State the number of primitive nth roots, if $n = pqr$ ..

iv. Shew how to determine whether a given equation has any equal roots.

Prove that the roots of the equation $x^4 + \frac{3}{2}qx^2 + rx + s = 0$, cannot be all real if $q^3 + r^2$ be positive.

5. If $p_n x^n + p_{n-1} x^{n-1} + \ldots\ldots + p_1 x + p_0 = f(x)$, shew how to sum the series

$$p_n \sin n\theta + p_{n-1} \sin (n-1)\theta + \ldots\ldots + p_1 \sin \theta + p_0.$$

If a pair of compasses, the distance between whose points is always a, be moved on by turning round each leg alternately, the arcs described being $a\dfrac{\pi}{2n}$, $a\dfrac{2\pi}{2n}$, $a\dfrac{3\pi}{2n}$ &c. in order, prove that when two consecutive points

about which the compasses turn first lie in a straight line with the first point, then the distance of the latter of the two points from that first point is $a \cot \frac{\pi}{4n}$.

vi. In any spherical triangle, prove that

$$\frac{\sin a}{\sin A} = \frac{\sin b}{\sin B} = \frac{\sin c}{\sin C},$$

and that each of these ratios is equal to

$$2 \cos \frac{a}{2} . \cos \frac{b}{2} . \cos \frac{c}{2} . \tan R,$$

where R is the radius of the small circle circumscribing the triangle.

Give a geometrical construction of a spherical triangle of which three given points shall be the middle points of the sides.

7. Investigate the equation of a straight line in the form

$$x \cos a + y \sin a - p = 0.$$

Determine the relation between p_1, p_2, p_3, if the three straight lines $x \cos a_1 + y \sin a_1 - p_1 = 0$, $x \cos a_2 + y \sin a_2 - p_2 = 0$, $x \cos a_3 + y \sin a_3 - p_3 = 0$, meet in a point, and shew that the same relation will hold between r_1, r_2, r_3 the distances of the feet of the perpendiculars p_1, p_2, p_3 from the common point of intersection.

8. From the definition, determine the polar equation of a conic section referred to a focus as pole.

If ABC be a triangle inscribed in a conic section so that the focus S is the center of the circle inscribed in the triangle, prove that

$$\frac{\cos \frac{A}{2}}{SA} + \frac{\cos \frac{B}{2}}{SB} + \frac{\cos \frac{C}{2}}{SC} = \frac{\cos \frac{A}{2} + \cos \frac{B}{2} + \cos \frac{C}{2}}{SL},$$

where SL is the semi-latus rectum.

9. Investigate the equation of an hyperbola referred to its asymptotes as axes of co-ordinates.

A series of hyperbolas having the same asymptotes is cut by a straight line parallel to one of the asymptotes, and through the points of intersection lines are drawn parallel to the other, and equal to either semi-axis of the corresponding hyperbola, prove that the locus of their extremities is a parabola.

x. Investigate the equations of a straight line in the form

$$\frac{x-a}{l} = \frac{y-b}{m} = \frac{z-c}{n}.$$

Prove that the general equation of all planes passing through this straight line is

$$\frac{x-a}{l} - \frac{y-b}{m} = \lambda \left(\frac{x-a}{l} - \frac{z-c}{n} \right),$$

where λ is an arbitrary constant.

Find the equation of the plane passing through a given straight line and parallel to another straight line.

xi. Shew how to find the plane diametral to a given straight line in a surface of the second degree when its equation is given in the most general form.

Determine the nature of the surface

$$x^2 + y^2 - z^2 + 2yz + 2zx - 2xy + 2x + 2y + 2z = a^2,$$

and find the magnitude and direction of its principal diameters.

xii. Determine the relations which exist between the co-ordinates of the extremities of any three conjugate diameters in an ellipsoid.

If closed polyhedrons of the same number of faces be inscribed in an ellipsoid, such that if $(x_r\ y_r\ z_r)$, $(x_s\ y_s\ z_s)$ be the co-ordinates of the extremities of any edge RS,

$$\frac{x_r x_s}{a^2} + \frac{y_r y_s}{b^2} + \frac{z_r z_s}{c^2} = L_{rs},$$

where L_{rs} is a given quantity, then the volumes of all these polyhedrons will be equal. Thence prove that the volume of the parallelopiped formed by three conjugate diameters is constant.

PROBLEMS.

1. Shew that the number of ways in which mn things can be divided among m persons so that each shall have n of them, is $\dfrac{\lfloor mn}{(\lfloor n)^m}$.

2. If ABC be a triangle whose sides touch a parabola, and p, q, r be the perpendiculars from A, B, C on the directrix, prove that

$$p \tan A + q \tan B + r \tan C = 0.$$

iii. If the lines which bisect the angles between pairs of tangents to an ellipse be parallel to a fixed straight line, prove that the locus of the points of intersection of the tangents will be a rectangular hyperbola.

iv. Three hyperbolas are drawn, whose asymptotes are the sides of a triangle ABC, taken two and two, prove that the direction of their three common chords pass through the angular points A, B, C and meet in a point, which will be the center of gravity of the triangle, if the hyperbolas touch one another.

5. A, P and B, Q are points taken respectively in two parallel straight lines, A and B being fixed and P, Q variable. Prove that if the rectangle AP, BQ be constant, the line PQ will always touch a fixed ellipse, or a fixed hyperbola, according as P and Q are on the same or opposite sides of AB.

vi. A uniform string hangs in the form of a loop by two small rings without weight from a smooth circular wire placed with its plane vertical, shew that the longest string, which is consistent with the rings remaining apart, is $2a \sin^2\theta$, a being the radius of the circle, and θ being determined by the equation

$$\log\left(\cot\frac{\theta}{2}\right) = \cot\theta \operatorname{cosec}\theta.$$

vii. Trace the curves whose equations are

$$xy^3 - x^2y^2 - ay^3 + a^2x^2 = 0,$$

and $$r = a(\cos 2\theta - \sin\theta).$$

Find the multiple points in the last curve.

8. If a given line be an equiconjugate diameter of an ellipse, the locus of the foci is a lemniscate.

ix. The locus of the middle points of chords of a lemniscate, drawn parallel to the axis, is a curve, whose equation is $y = \dfrac{4x^2 - a^2}{2\sqrt{(2)}\sqrt{(a^2 - 2x^2)}}$, if $2a$ be the length of the axis.

Trace the curve, and account for the branches which extend beyond the lemniscate.

x. Prove that the volume of that portion of the solid, bounded by the surface whose equstion is

$$x^2z + ay^2 = z(a^2 - z^2),$$

which lies on the positive side of the plane of xy, is $\frac{8}{21}\pi a^3$.

11. Prove that $\frac{d^n y}{dz^n} = (-1)^n x^{n+1} \frac{d(x^{n-1}y)}{dx^n}$, where $z = \frac{1}{x}$, and hence integrate the equation $x^{2n}\frac{d^n y}{dx^n} = ay$.

xii. Two particles revolve in the same direction in an oval orbit round a center of force S which divides the axis unequally, from the extremities of a chord PQ through the center of force: prove that, when they arrive in positions R, T respectively, such that the angle RST is a minimum, the time from R to the next apse will be an arithmetic mean between the times from P to the next apse and to Q from the last apse.

13. An elastic string, whose mass is ma and unstretched length a, is confined within a straight tube, to one end of which it is fastened and which revolves with uniform angular velocity ω in a horizontal plane. Shew that the length of the string when in relative equilibrium is $a\frac{\tan\theta}{\theta}$ where $\theta = a\omega\sqrt{\left(\frac{m}{\lambda}\right)}$, λ being the tension required to double the length of the string.

xiv. Any number of strings are revolving uniformly about a vertical axis through a point to which the strings are attached; prove that, if, in a position of relative equilibrium, the tensions at the highest points be all equal, the other ends will lie in a paraboloid.

xv. A rough right cone is placed so that the inclinations to the horizontal of the highest and lowest generating lines are γ and γ', prove that, if θ be the greatest inclination to the vertical plane through the axis, in which a particle can rest on the surface, and λ be the angle of friction,

$$\tan^2\frac{\theta}{2} = \frac{\cos\gamma - \cos\lambda}{\cos\gamma' + \cos\lambda}.$$

16. A frustum of a right cone, whose vertical angle ($2a$) lies between 30^0 and 60^0, is made by a plane bisecting the axis and parallel to the base, and has its interior surface polished. If a luminous point be placed at the center of its base, prove that the radius of the bright circle formed on a screen passing through the point where the vertex would have been and perpendicular to the axis, will be $a\cot(30^0 + a).\cot(30^0 - a)$, where a is the radius of the base.

xvii. A bright circular wire, of radius a, is placed upon a table, and a luminous point moves upwards from any point A in the wire with uniform velocity v; an eye is placed vertically over the point B in the diameter AB, shew that the line joining points P, P' at which the light is reflected to the eye moves with a velocity whose acceleration is $\frac{v^2}{2a}$, and that if the eye be at a height $2a$, the distance BP increases with velocity $\frac{v}{\sqrt{(2)}}$.

18. The observed distances of a comet from the Sun r, r' as it passes its

Nodes are the one too great and the other too small by the same small quantity. Prove that the approximate error in the calculated longitude of the perihelion, measured along the comet's orbit, is $\frac{\delta}{\sqrt{(rr')}}$, and in the perihelion distance $\frac{r' - r}{r' + r}\delta$.

xix. In passing from one place to another, so that the curve is always inclined to the meridian at the same angle, shew that the tangents of the constant angles of inclination for the path which goes direct from one to the other, and for those which go once, twice, and more times round the earth, will be in arithmetic progression.

20. A particle is placed on a rough plane lamina which is initially horizontal, and which is moveable about a horizontal line through its center of gravity. Shew that the particle will begin to slip when the plane has turned through an angle $\tan^{-1}\frac{\mu Ma^2}{9mc^2 + Ma^2}$, μ being the coefficient of friction, $2a$ the length of the plane perpendicular to its axis of revolution, c the distance of the particle from that axis, and M and m the masses of the lamina and particle.

21. A ring is constrained to remain in a vertical plane, and to be always in contact with a rough horizontal plane, by passing through a smooth fixed ring at the extremity of a horizontal diameter. A weight equal to $\frac{1}{n}$th of the weight of the ring is attached to it at the other extremity of the horizontal diameter. Shew that the weight will just reach the horizontal plane if the coefficient of friction be either of the roots of the equation

$$\mu^2 - \mu\frac{\pi}{2}\left\{\frac{1}{2(n+1)} + (n+1)\right\} + 1 = 0.$$

NATURAL PHILOSOPHY.

1. If a pencil of light be incident on a small reflecting or refracting surface whose semi-diameters in the primary and secondary planes are λ_1, λ_2 respectively, and if v_1, v_2 be the distances from the surface of the primary and secondary foci, prove that the distance v of the circle of least confusion from the middle point of the surface will be given by the formula

$$\frac{\lambda_1 + \lambda_2}{v} = \frac{\lambda_1}{v_1} + \frac{\lambda_2}{v_2}.$$

Prove also that this section of the reflected or refracted pencil is a circle only when the surface is an ellipse; and that there is in that case another circular section parallel to the former and whose position may be found by changing the sign of λ_2 in the above expression.

ii. Describe the experiment by which Newton effected the decomposition of white light.

If the prism be placed at first in a position of minimum deviation for the red rays and afterwards for the violet rays, in which case do we obtain the longer spectrum, the distances of the screen and prism from the aperture being unaltered?

iii. If the Moon's culminating altitude at any place on any day be observed to be A, and her declination an horary motion in declination be δ^0 and m^0 respectively, prove that the interval expressed in seconds between her culmination and transit over the meridian of the place will be nearly

$$\frac{m}{\sin 1''} \cdot \frac{\cos A}{\cos \delta \sin (A - \delta)}.$$

Hence explain how, by the aid of a sextant and the Nautical Almanac, the longitude of a place may be determined.

4. If the sphericity of the Earth be neglected, prove that the refraction of a star will vary as the tangent of the apparent zenith distance.

This result is found to agree with observation if the zenith distance be not very large. Explain how this agreement is proved to exist.

v. If a particle move in a resisting medium under the action of a central force, prove that the velocity at any point is that due to one-fourth of the chord of curvature through the center.

Two homogeneous spheres are composed of different substances, and move in a medium, the resistance of which is proportional to the velocity, under the action of their mutual attraction which is any function whatever of the distance between their centers. Prove that if their radii be inversely proportional to their densities, their center of gravity will either remain at rest or else move in a straight line, according to the original circumstances of projection.

6. Enunciate and prove the principle of the conservation of areas.

If a system of particles mutually attracting each other and under the influence of no external forces be initially at rest; prove that if at any time they all become rigidly connected the system so formed will be at rest.

vii. If at any time t, the co-ordinates of a point in a mass of fluid in motion be x, y, z, the velocities of that point parallel to the co-ordinate axes be u, v, w, and ρ the density at that point; prove that the equation of continuity of the fluid is

$$\frac{d\rho}{dt} + \frac{d(\rho u)}{dx} + \frac{d(\rho v)}{dy} + \frac{d(\rho w)}{dz} = 0.$$

If a bomb-shell explode at a very great depth below the surface of the sea, prove that the impulsive action at any point of the water will be inversely proportional to the distance of that point from the center of the shell.

8 If a particle describe an ellipse about the focus, trace the effect on the further apse of a small disturbing force, acting in the direction of a normal to the orbit, during one complete revolution.

If a particle describe an ellipse of small eccentricity about the focus, and if it be disturbed by the attraction of a very distant center of force, prove that the ellipse will tend to place itself with the major axis perpendicular to the direction of the force.

ix. Given that

$$u = a\,[1 - \frac{m^2}{2} + e \cos (c\theta - a) + m^2 \cos \{(2 - 2m)\,\theta - 2\beta\}$$
$$+ \tfrac{15}{8} me \cos \{(2 - 2m - c)\,\theta - 2\beta + a\}$$
$$+ \tfrac{15}{4} me^2 \cos \{(2 - 2m - 2c)\,\theta - 2\beta + a\} - \tfrac{3}{2} m^2 e^2 \cos (m\theta + \beta - \zeta)],$$

$$\frac{dt}{d\theta} = \frac{1}{hu^2} \left(1 - \int \frac{T}{h^2 u^3}\, d\theta\right),$$

$$T = -\frac{3m^3}{2} \sin 2\,(\theta - \theta').$$

Investigate the inequality in the longitude called the Variation.

10. An elastic string whose unstretched length is l, has its extremities fixed at two points whose distance is l', and the string is very slightly disturbed from its position of rest. Prove that the transversal vibrations will travel along the length of the string in the time $\sqrt{\frac{lW}{gT}}$ and the longitudinal in the time $\sqrt{\frac{lW}{gE}}$ where W is the weight of the string, T its tension, and E the modulus of elasticity.

If two strings of lengths l, l', and of different elasticities E, E', be attached together and the other extremities be fastened to two fixed points; prove that, when E and E' are very great, the pitch, T, of the notes which may be sounded will be given by the equation

$$\frac{\tan \frac{2\pi l}{aT}}{\tan \frac{2\pi l'}{a'T}} = \frac{E}{E'}, \text{ or } \frac{a'}{a},$$

according as the vibrations are longitudinal or transversal, where a, a' are the velocities of transmission along the two strings.

PROBLEMS.

1. AD bisects the angle A of a triangle ABC, and is produced to P, so that the difference of the angles PBC and PCB is a maximum, shew that their sum is $\frac{1}{2}A$.

2. If a series of parallel plane sections of an ellipsoid be taken, and on any sections as base a right cylinder be erected, shew that the other plane section, in which it meets the ellipsoid, will meet the plane of the base in a straight line whose locus will be a diametral plane of the ellipsoid.

3. Through a given point (x_0, y_0, z_0) a series of chords are drawn to an ellipsoid, whose equation is

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} + \frac{z^2}{c^2} = 1,$$

in such directions that the line of intersection of the tangent planes at the extremities of each chord is perpendicular to the chord.

Prove that these chords must all lie upon the conical surface of which the equation is

$$\frac{(b^2 - c^2)\, x_0}{x - x_0} + \frac{(c^2 - a^2)\, y_0}{y - y_0} + \frac{(a^2 - b^2)\, z_0}{z - z_0} = 0.$$

Prove also that the envelope of the lines of intersection of the tangent planes, drawn as above described, is a parabola, which is the intersection of the polar plane of (x_0, y_0, z_0) with the cone of which the equation is

$$\frac{\sqrt{\{(b^2 - c^2)\, xx_0\}}}{a} + \frac{\sqrt{\{(c^2 - a^2)\, yy_0\}}}{b} + \frac{\sqrt{\{(a^2 - b^2)\, zz_0\}}}{c} = 0.$$

4. ABC is an indefinite material straight line of uniform thickness and density. The portion AB repels and BC attracts with a force varying inversely as the square of the distance. Prove that if a particle be placed

anywhere in the perpendicular to AC through B, and be then left to move under the action of the attracting line, the velocity at any point P of its path will be proportional to $\sqrt{\{(\log_e \cot \frac{1}{2}PBC)\}}$.

5. Prove that the problem of finding the position of equilibrium of a solid cone on any elliptic base, floating in a heavy fluid, is the same as that of drawing normals to a hyperboloid of two sheets from an internal point.

6. Two particles of equal weight are connected by a string of length $2l$, which passes over a fixed pulley, and they rest on a smooth inclined plane, β is the inclination of the two portions of the string to the plane when the particles are together, and α that of the plane to the horizon. Prove that, if they be slightly displaced, the length of the simple isochronous pendulum will be

$$\frac{l \cos\beta}{\sin\alpha \sin^2\beta}.$$

7. Three small rings of equal mass are fitted on three smooth rods, which are parallel and in the same plane, one being half-way between the other two.

Prove that, if they be subject to mutual attraction, according to the law of gravitation, and placed so that the line joining any two of them is very nearly perpendicular to the rods, the middle ring and the center of gravity of the other two will oscillate in a time $\frac{\pi}{\sqrt{(3\mu)}}$ and the other two relatively to each other in a time $\frac{2\pi}{\sqrt{(5\mu)}}$, μa being the attraction at a distance a.

8. A straight rod is just immersed in a vertical position in water, the critical angle of which is α, and an eye is placed at a given distance from that extremity of the rod which is in the surface of the water.

Prove that, when the eye is in such a position that the image of the rod subtends at the eye a maximum angle, the ray, by which the lowest extremity of the rod is made visible, is incident upon the water at the angle $\cos^{-1}\sqrt{(\cos\alpha)}$.

9. The internal surface of a right cylinder is grooved by lines parallel to the axis: prove that, if a luminous point and the eye be placed on opposite generating lines, a bright curve will be seen, which is the intersection of the cylinder with two hyperbolic paraboloids.

10. A refracting medium consists of layers of spherical surfaces of equal refracting power each of which touches a plane at the same point, and the refractive index for each surface varies inversely as the diameter of that surface.

Prove that, when a ray of light passes through the medium in a plane containing the common diameter, the chord of curvature at any point of the path, drawn in the direction of the center of the surface corresponding to that point, is twice the distance of the point from the common tangent plane, and also that the projection of the radius vector from the common point of contact upon the direction of the ray is constant.

11. A sphere is pressed between two perfectly rough parallel boards which are made to revolve with the uniform angular velocities Ω and Ω' about fixed axes perpendicular to their planes. Prove that the center of the sphere describes a circle about an axis which is in the same plane as the axes of revolution of the boards, and whose distances from these axes are inversely proportional to the angular velocities about them.

Shew that, when the boards revolve about the same axis, their points of contact will trace on the sphere small circles, the tangents of whose

angular radii will be $\frac{c}{a} \times \frac{\Omega \sim \Omega'}{\Omega + \Omega'}$, a being the radius of the sphere, and c that of the circle described by its center.

12. A frame, formed of four equal uniform rods loosely jointed together at the angular points, so as to form a rhombus, is laid upon a smooth horizontal plane and a blow is applied to one of the rods in a direction at right angles to it.

Prove that the frame will begin to move as a rigid body provided the middle point of the rod which receives the blow be equidistant from the line of action of the blow and the perpendicular dropped upon the rod from the center of gravity of the frame.

Prove also that, in this case, the initial angular velocity of the rod which receives the blow is $\frac{1}{8}$th of what it would have been had it been unconnected with the remaining rods.

13. A uniform wire is bent into the form of a circle whose center is C, and two points A and B at the extremity of a diameter are fixed. The wire is then heated, so that it expands uniformly throughout, and assumes an oval form whose semi-axis major is CD. The tendency at any point to become straight being proportional to the curvature at that point, prove that CD is a harmonic mean between the radii of curvature at A and D.

Prove also that, if the expansion of the wire be very small, the increase of its whole length will be to the greatest diametral increase as $\pi^2 - 8 : \pi - 2$.

14. A uniform heavy elastic string hangs from a point by one extremity, and begins to move from such a state that all its parts are unstretched; the tension of any portion of the string, if stretched to double its natural length, is the weight of a portion whose unstretched length is l, and c is that of the given string.

Prove that a complete oscillation of all parts will take place in a time $\frac{4c}{\sqrt{(lg)}}$, the lowest point oscillating through a space $\frac{c^2}{l}$, and that, during each such oscillation, any portion, whose initial distance from the point of suspension was nc, will twice move with uniform velocity for a time $\frac{2(1-n)c}{\sqrt{(lg)}}$.

PURE MATHEMATICS.

1. Define the terms differential coefficient, and partial differential coefficient, and shew how to obtain the partial differential coefficients of the first order of an implicit function of two independent variables. Find the differential coefficients of $\sin x$ and $\log_a x$ respectively, and prove that if p, q, r, s, t be the partial differential coefficients of the first and second order respectively obtained from the equation $z = f(x, y)$, and $\frac{d^2y}{dx^2}$ be a partial differential coefficient obtained from the equivalent equation

$$y = \phi(x, z),$$

then
$$\frac{d^2y}{dx^2} = -\frac{1}{q^3}\{p^2t - 2pqs + q^2r\}.$$

2. State the conditions necessary for the truth of the equation

$$\frac{F(x_1 + h) - F(x_1)}{f(x_1 + h) - f(x_1)} = \frac{F^{n+1}(x_1 + \theta h)}{f^{n+1}(x_1 + \theta h)},$$

and deduce Taylor's theorem from this equation.

If A_0, A_1, &c. be the successive coefficients in the expansion of $e^{c^{mx}}$ prove that

$$A_{n-1} = \frac{m}{n+1}\left\{A_n + \frac{m}{1}.A_{n-1} + \frac{m^2}{1.2}A_{n-2} + \&c. + \frac{m^n}{1.2..n}A_0\right\}.$$

3. If $f(x)$ be a continuous function of x, shew how to determine the values of x which render $f(x)$ a maximum or minimum, and deduce tests for distinguishing between the cases of maximum and minimum.

If the sum of the squares of the sides of a triangle be s^2 and the product of the perpendiculars from the extremities of one of the sides upon the other two be p^2, prove that the ratio of these two sides will be a maximum when the angle between them is

$$\cos^{-1}\frac{p^2}{s^2}.$$

4. When is one curve said to have a contact of the nth order with another curve? Find an expression for the radius of the circle having a contact of the second order with a given curve at a given point.

If r and ρ be the radius vector and radius of curvature at any point of a plane curve, θ and ϕ their respective inclinations to the prime radius, and s the length of the arc measured from some fixed point; prove that

$$r\rho = \frac{d^2sdr - d^2rds}{d\phi^2d\theta - d\theta^2d\phi}.$$

5. Shew how to find the locus of the ultimate intersection of a family of curves whose equations involve one arbitrary parameter.

Prove that the equation of the locus of the ultimate intersection of the lines defined by the equation

$$x\cos 2\theta + y\sin 2\theta = 2a\cos\theta,$$

where a is a given constant, is

$$(x^2 + y^2 - a^2)^3 = \tfrac{27}{4}a^4x^2.$$

6. Trace the curve obtained in the last question, and prove that the radius of curvature at any point is three-fourths of the perpendicular from the origin upon the tangent at that point.

vi. Integrate

$$\int\frac{dx}{\sqrt{(3 - 2x - x^2)}},\ \int\frac{x^5dx}{(a + bx^3)^2},\ \int\frac{dx}{(a^2 - x^2)\sqrt{(b^2 - x^2)}},\ \text{and}\ \int\varepsilon^{ax}\sin(bx)\,dx;$$

and prove that

$$\iint\sqrt{\left\{\frac{1 - a^2(x^2 + y^2)}{1 - (x^2 + y^2)}\right\}}\,dx\,dy = \frac{\pi}{4a}\left\{a + \frac{1 - a^2}{2}\log\frac{1 + a}{1 - a}\right\},$$

the limits of integration being $y = 0$ to $y = \sqrt{(1 - x^2)}$ and $x = 0$ to $x = 1$.

A solid is bounded by two paraboloids having a common focus and their principal diameters coincident and in the same direction, and by a sphere whose center is at the common focus. Prove that the volume is

$$= 2\pi\left\{c^2 - \frac{a^2 + ab + b^2}{3}\right\}(a \sim b),$$

where $4a$ and $4b$ are the latera recta of the paraboloids, and c is the radius of the sphere.

vii. If an oval curve roll on a straight line, prove that the area traced out in one complete revolution by any point O in the curve will exceed the area of the curve by $\frac{1}{2}\int_0^{2\pi} r^2 d\psi$, where r is the distance from O of any point P of the curve, and ψ is the angle which the tangent at P makes with some fixed line in the curve. Apply this method to find the area of a cycloid.

If an oval curve A roll upon an equal and similar curve B so that the point of contact is a center of similitude for each, then the whole area traced out by any point O when A has made a complete revolution is twice the area which would have been traced out if the curve A had rolled on a straight line.

viii. Solve the simultaneous differential equations

$$\left.\begin{aligned} \frac{d^2x}{dt^2} &= ax + by \\ \frac{d^2y}{dt^2} &= a'x + b'y \end{aligned}\right\},$$

where a, b, a', b' are constants. Point out the different forms which the values of x and y may assume.

ix. If l, m, n be the direction-cosines of the normal to the osculating plane at any point of a curve of double curvature, and r be the radius of torsion, prove that

$$r\frac{dl}{ds} = \cos\alpha,\ r\frac{dm}{ds} = \cos\beta,\ r\frac{dn}{ds} = \cos\gamma,$$

$$\frac{1}{r^2} = \left(\frac{dl}{ds}\right)^2 + \left(\frac{dm}{ds}\right)^2 + \left(\frac{dn}{ds}\right)^2,$$

where α, β, γ are the angles which the radius of circular curvature make with the axes.

x. Define a geodesic line. If l, m, n be the direction-cosines of the normal at any point (x, y, z) of a surface, prove that the general equation of all geodesic lines is

$$\frac{\frac{d^2x}{ds^2}}{l} = \frac{\frac{d^2y}{ds^2}}{m} = \frac{\frac{d^2z}{ds^2}}{n} = \rho,$$

where ρ is the radius of curvature at the point (x, y, z).

If a geodesic line be drawn on a developable surface and cut any generating line of the surface at an angle ψ and at a distance t from the edge of regression measured along the generator, prove that

$$\frac{dt}{d\psi} + \cot\psi \,.\, t = \rho,$$

where ρ is the radius of curvature of the edge of regression at the point where the generator touches it.

PROBLEMS.

I. If in a tetrahedron the shortest distances between opposite edges are mutually at right angles, prove that these distances meet in a point, that they bisect each other, and that the opposite edges of the tetrahedron are equal.

2. Find the point in a straight line, drawn perpendicular to the major axis of an ellipse at a distance d from the center, at which the tangents to the ellipse include a maximum angle, and shew that no such point exists out of the major axis produced unless d be greater than $\frac{ae}{\sqrt{(2e^2-1)}}$.

3. Trace the curve $r^3 = a^3 \cot\theta$, and shew that the whole area enclosed by it is equal to $2\pi a^2$.

4. If the three angles of a spherical triangle be together equal to four right angles, prove that the area of the triangle formed by joining the middle points of its sides is one-eighth of the surface of the sphere.

5. If SY be the perpendicular from the pole S on the tangent to a curve at the point P, and if there be a cusp at P the circle of curvature at Y to the locus of Y will pass through S. If there be a point of inflexion at Y in the locus of Y the chord of curvature at P through S will be equal to $4SP$. Explain this result when the locus of P is a parabola.

6. A right circular conical surface cut by a plane parallel to a generating line is slit down this generating line and developed. Find the equation of the curve formed by the parabolic section, and prove that if α, the semi-vertical angle of the cone, be less than $\frac{1}{4}\pi$, the curve has two points of inflexion whose distance from the vertex of the cone : distance of the vertex of the parabola from that of the cone :: $2\cos^2\alpha : 1$.

7. Two equal uniform rods whose density is ρ are jointed together at an angle 2α. If they be immersed with the angle downwards in a fluid of density σ, find the positions of equilibrium, and shew that the rods cannot rest with the line joining their extremities inclined to the horizon unless $\frac{\sigma-\rho}{\sigma+\rho}$ be greater than $\sin^2\alpha$. If this condition be fulfilled, determine which of the positions of equilibrium is stable.

8. Two infinite rods of the same uniform material and thickness are rigidly fastened at right angles to each other at one extremity of each. The matter of which the rods are composed attracts according to the law of nature; shew that a smooth ring will rest in equilibrium on a wire bent into the form of the curve $(xy+a^2)^2 = 2a^2(x+y)^2$ at any point, the axes of co-ordinates coinciding with the rods, and a being an arbitrary constant.

9. Two heavy particles of masses m, m' are connected by an elastic weightless string which passes round a smooth peg. The heavier (m') initially rests on a horizontal platform, and the string is double its natural length. If the platform be removed, prove that in the ensuing motion each weight will oscillate in a time $2\pi\sqrt{\left\{\frac{m'a}{(m+m')g}\right\}}$, about a point at a constant distance from the position where it would have been, had the string been inelastic, a being the unstretched length of the string.

10. A sphere is projected on a rough horizontal plane so as partly to roll, and partly to slide. If the initial velocity of translation be v, the initial rotation ω about a horizontal axis, and the direction of the former make an angle α with the axis of the latter, shew that the angle through which the direction of motion of the center has turned when perfect rolling begins is

$$\tan^{-1}\frac{2a\omega\cos\alpha}{5v-2a\omega\sin\alpha}.$$

11. If a ray of light whose direction is a tangent to a surface of the second order be reflected at a homofocal surface, the direction of the reflected ray will be again a tangent to the surface.

12. If one of the principal axes of a cone which stands on a given base be always parallel to a given right line, the locus of the vertex is an equilateral hyperbola or a right line according as the base is a central conic or a parabola.

13. A surface is generated by the motion of a variable circle which always intersects the axis of x and is parallel to the plane of y, z. If r be the radius of the circle at a point on the axis of x, and θ the inclination of the diameter through that point to the axis of z, prove that the principal radii of curvature at the point are given by the equation $\rho^2 r + p^2(\rho - r) = 0$, when p is the value of $\frac{dx}{d\theta}$ at the point.

14. A rough horizontal plane lamina is capable of rotating freely round a vertical axis. If a heavy particle of mass m be placed at any point upon it, and an angular velocity ω be given to the plane, shew that the length of the arc traversed by the particle on the plane when it just comes to rest relatively to the plane will be $\frac{Mk^2}{2\mu mg}\omega(\omega - \omega')$; ω' being the ultimate angular velocity, Mk^2 the moment of inertia of the lamina about the axis of revolution, and μ the coefficient of friction.

15. A uniform cylinder is rigidly fixed with one end in a vertical wall and its axis horizontal, and two particles of equal weight are rigidly attached to the middle and extreme transverse sections by equal vertical rods, so as to be capable of oscillating under the action of the torsion of the cylinder. Assuming that the couple required to keep a transverse section twisted through an angle varies directly as the angle, and inversely as the distance of the section from the point of rigid attachment, shew that, neglecting the inertia of the cylinder, each of the above pendulums will, when slightly twisted from the vertical position, have a double oscillation, for which the simple isochronous pendulums are $\frac{1}{m}$th and $\frac{1}{n}$th of that for each of the particles oscillating freely, where

$$m - 1 : n - 1 :: 3 + \sqrt{(5)} : 3 - \sqrt{(5)}.$$

PURE MATHEMATICS AND NATURAL PHILOSOPHY.

1. If the sum of a given series be known, shew how to find the sum of every nth term beginning at the mth, m being less than n.

Hence sum the series $x + \frac{1}{3}x^5 + \frac{1}{5}x^9 +$ ad inf.

ii. Prove that, if ABC be a small spherical triangle in which E is the spherical excess, the angles of the plane triangle whose sides are equal to those of the spherical triangle, are the angles A, B, C diminished by $\frac{1}{3}E$.

If the triangle be projected gnomonically upon the tangent plane to the sphere at the center of the circumscribed circle, in the triangle so formed the angle which corresponds to $A = A - \frac{1}{4}E(\cot B \cot C + 1)$.

3. If α, β, γ denote the perpendiculars from a point on three given straight lines, shew that the general homogeneous equation of two dimensions in α, β, γ represents a conic section, and, assuming the co-ordinates of its center, shew how to determine the magnitude and position of its axes.

Prove that the straight lines represented by the equation

$$(\alpha^2 - \beta^2)\sin C + k(\alpha \sin A + \beta \sin B)(\beta \cos B - \alpha \cos A) = 0,$$

are parallel to the axes of the conic section $2\alpha\beta = k\gamma^2$ where A, B, C are the angles of the triangle formed by the three given straight lines.

4. Transform the integral

$$\iiint (x-y)(y-z)(z-x)(x+y+z)\,dxdydz$$

into one in which u, v, w are the independent variables where

$$u^3 = xyz,$$

$$\frac{1}{v} = \frac{1}{x} + \frac{1}{y} + \frac{1}{z},$$

$$w^2 = x^2 + y^2 + z^2.$$

v. Shew how the solution of the linear equation

$$\frac{d^2y}{dx^2} + P\frac{dy}{dx} + Qy + R = 0,$$

may be made to depend upon that of an equation of the first degree.

Apply the method to the solution of

$$\frac{d^2y}{dx^2} + \frac{2}{x}\frac{dy}{dx} + n^2y = \frac{1}{x}.$$

Solve the differential equation

$$\frac{d^2\phi}{dx^2} + \frac{d^2\phi}{dy^2} + \frac{d^2\phi}{dz^2} + n^2\phi = 0,$$

in the case in which ϕ is a function of r, where $r^2 = x^2 + y^2 + z^2$.

6. A rigid body, one point of which is fixed, is struck by given impulses, determine its change of motion.

A plane lamina moving, either about a fixed axis or instantaneously about a principal axis, impinges on a free inelastic particle in the line through its center of gravity perpendicular to the axis of rotation at the time of impact. If the velocity of the particle after impact be the maximum velocity, prove that the angular velocity of the lamina will be diminished in the ratio of 2 : 1.

vii. Assuming that when two plates of glass are separated by a very small interval, and the light is reflected on the lower surface of the first and the upper surface of the second glass, the intensity of the reflected light is given by the expression

$$\frac{4a^2e^2\sin^2\left(\frac{2\pi}{\lambda}D\cos\beta\right)}{(1-e^2)^2 + 4e^2\sin^2\left(\frac{2\pi}{\lambda}D\cos\beta\right)},$$

β being the angle of incidence, and D the distance of the plates; examine the colour of the reflected light when the incident light ia white, for a value of $D\cos\beta$ nearly of the same magnitude as λ, and for a value a thousand times as great.

In making Newton's rings with two lenses investigate the effect on the appearance of the reflected light if the lenses be separated by a small interval.

viii. Calculate the rate of change of the eccentricity of the instantaneous ellipse, when one planet is disturbed by another, shew that it is

$$-\frac{n_1a_1\sqrt{(1-e_1^2)}}{\mu e_1}\left(\frac{dR}{d\varepsilon_1} + \frac{dR}{d\varpi_1}\right) + \frac{n_1a_1(1-e_1^2)}{\mu e_1}\frac{dR}{d\varepsilon_1}.$$

9. In approximating to the solutions of the equations in the Lunar theory to any given order, what terms must be retained in the different expressions involved?

Given that

$$\frac{T}{h^2u^3} = -\frac{3m'u'^3}{2h^2u^4}\sin 2(\theta - \theta'),$$

and that the solutions of the equations to the first order give the results

$$u = a\{1 + e\cos(c\theta - \alpha)\},$$
$$u' = a'\{1 + e'\cos(m\theta + \beta - \zeta)\},$$
$$\theta - \theta' = (1 - m)\theta - \beta - 2e'\sin(m\theta + \beta - \zeta),$$

examine the terms which must be retained in $\frac{T}{h^2u^3}$ and in $\int\frac{T}{h^2u^3}\,d\theta$ in order to find u and t to the second order.

PURE MATHEMATICS AND NATURAL PHILOSOPHY.

1. FIND the general value of u_x satisfying the linear equation of differences

$$u_{x+1} - A_xu_x = B_x.$$

Integrate the equation

$$u_{x+2} - 2(x-1)u_{x+1} + (x^2 - 3x + 2)u_x + 1.2.3\ldots.x.$$

ii. If $F(\alpha, \beta, \gamma) = 0$ be the relation which holds between the co-ordinates of any tangent to a curve, prove that $\alpha F'(\alpha') + \beta F'(\beta') + \gamma F'(\gamma') = 0$ is the equation of the point of contact of a tangent whose co-ordinates are α', β', γ'.

Find the condition that the curve may be a parabola.

3. Find the equation of the brachystochrone when a particle moves from one fixed point to another under the action of a central force.

If a particle be constrained to move from one fixed point to another, along a curve which is concave to a center of force, prove that if the force be always attractive, the time of motion will be less along this curve than it would have been along any other curve joining the two points and including the former, provided the velocity of projection be always the same.

iv. Investigate the general equation of all surfaces of revolution, and deduce the differential equation of such surfaces.

5. If a homogeneous sphere be moveable about its center of gravity as a fixed point, and if θ be the inclination of its instantaneous axis to a diameter fixed in the body, ϕ the inclination of the plane in which θ is measured to a plane fixed in the body, I the impressed couple about the instantaneous axis, K the impressed couple about the normal to the plane in which θ is measured, A the moment of inertia about a diameter and ω the instantaneous angular velocity:

$$\text{prove that } A\frac{d\omega}{dt} = I, \qquad A\omega\sin\theta\frac{d\phi}{dt} = K.$$

Hence prove that, if the sphere be acted upon by a constant couple whose axis is always perpendicular to the instantaneous axis, and always in the same fixed plane in space, the instantaneous axis will describe this fixed plane in space, and a certain right cone in the body, each with uniform angular velocity.

6. If the motion of a mass of elastic fluid be such that every particle is moving towards or from the same fixed point and v be the velocity at the time t of a particle which is at that time at the distance r from the fixed point. Prove that

$$\frac{d^2v}{dt^2} = K\left\{\frac{d^2v}{dr^2} + \frac{2}{r}\frac{dv}{dr} - \frac{2v}{r^2}\right\} - \frac{d}{dt}\left(\frac{dv^2}{dt} + v^2\frac{dv}{dr}\right).$$

Hence deduce the equation

$$\phi = \frac{1}{r}\{F(r + at) + f(r - at)\}$$

in the case of the propagation of sound emanating from a center of disturbance.

vii. In the complete developement of R in a series of simple cosines, shew that the order of the term in which the argument is $(pn' - qn)t + \alpha$ is $p \sim q$.

In the calculation of the constant part of R, shew that additional terms will be introduced if the mean motion of one planet be double that of the other.

viii. Prove that in a doubly refracting crystal, there are two directions in the plane front of a wave of light traversing the crystals in which if the vibrations take place, the light will be propagated without separation.

PURE MATHEMATICS AND NATURAL PHILOSOPHY.

1. WHAT fundamental assumption is made in the usual theory of probabilities, if the mathematical definition of a probability be consistent with the ordinary meaning of the term?

An event has happened which must have arisen from some one of a given number of causes: investigate the probability that it arose from an assigned cause.

An event may happen from different causes at any time at every point in an infinite straight line, and is known to have happened once at every point at some time or other. The probability of its happening between the distances x and $x + \delta x$ from a fixed point $\propto f(x)\,\delta x$, and if it happen between these points the probability of its happening between the times t and $t + \delta t \propto F(x, t).\delta t$. The event is known to have happened once at least between the times t_1, and t_2. Find the probability that this took place between the distances a and b from the fixed point.

ii. Solve the differential equations:

$$p = q\phi(z),$$
$$xr + (x + y)s + yt + 2(p + q) = 0.$$

If a particular integral of any equation of the second order be found of the form $\phi(x, y, z, p, q, a, b) = 0$ with two arbitrary constants, prove that a more general integral may be found by writing for b any arbitrary function of a, and then eliminating a between the equations $\phi = 0$, $\frac{d\phi}{da} = 0$.

3. Find the principal radii of curvature at any point of an ellipsoid, and shew that if ρ be one of these radii and p the perpendicular from the center on the tangent plane, the point will lie on a homofocal surface provided $p\rho$ be constant.

If three homofocal surfaces of the second degree intersect in a point, the centers of principal curvature, at the common point, of any one are the poles with respect to the other two of the tangent plane to the first at that point.

iv. A body under the action of any forces is free to turn about a fixed point O at which two of the principal moments are equal. Investigate the equations of motion with reference to rectangular axes, one of which is the axis of unequal moment at O and the other two turn about O as origin in any given manner.

5. Shew roughly that the Solar must be less than the Lunar precession, and that considering Solar nutation alone the inclination of the pole of the Earth to the pole of the ecliptic is least at the solstices and greatest at the equinoxes.

Assuming the motion of the pole of the Earth parallel to the Moon's orbit, produced by the Moon's action, during a sidereal revolution to be

$$\frac{6\pi^2 B \sin i \cos i}{Tw(n+1)},$$

i being the inclination of the Earth's axis to the pole of the Moon's orbit, T the time of a sidereal revolution, investigate the Lunar precession of the equinoxes.

vi. Assuming the expression $\frac{da_1}{dt} = -\frac{2na^2}{\mu}\frac{dR}{d\varepsilon}$ deduce the expression for $\frac{dn_1}{dt}$. If the general term of the disturbing function R be

$$Pe^{\kappa}.\varepsilon'^{\kappa'}\cos\{(pn - qn')t + p\varepsilon - q\varepsilon' - \kappa\omega + \kappa'\omega'\},$$

where n and n' are not commensurable with each other; prove that neither a nor n will be affected by any secular inequality.

State the physical cause of the secular acceleration of the Moon's mean motion, and shew that its existence is not contradicted by the above proposition.

7. An infinite cylinder of radius a is moving with a constant velocity v, in a homogeneous and inelastic fluid, which is acted on by no external forces, so that any point in its axis travels along a straight line perpendicular to the axis. Shew that initially the velocity, relative to the cylinder, of a particle of fluid at a distance r from the axis is $\frac{a^2}{r^2}v$, and that the initial relative lines of motion lie in cylinders touching the plane in which the axis travels.

viii. A plane wave of light polarized in the plane of incidence falls on a plane refracting medium. Assuming the general equation of motion to be

$$\frac{d^2w}{dt^2} = a^2\left(\frac{d^2w}{dx^2} + \frac{d^2w}{dy^2}\right),$$

where the axis of z is perpendicular to the plane of incidence, and w is the disturbance of any particle, prove that if the coefficient of the incident wave be unity, those of the reflected and refracted waves will be respectively

$$-\frac{\sin(i-r)}{\sin(i+r)} \text{ and } \frac{2\cos i \sin r}{\sin(i+r)},$$

where i and r are the angles of incidence and refraction.

If the incident light be white, are the colours of the refracted light mixed in the same proportion? Has the result been confirmed by any experiments?

LIST OF HONORS AT THE BACHELOR OF ARTS' COMMENCEMENT.

*** *In all cases of equality, the names are bracketed.*

Wranglers.		Senior Optimes.		Junior Optimes.	
Ds ALDIS	Trin.	Ds Williams	Joh.	Ds Quilter	Pet.
2 Bond	Magd.	Churchill	Joh.	69 Heath	Trin.H.
3 Hudson	Joh.	Sweeting	Trin.	70 Burney	Trin.
4 Hensley	Christ's	38 Helt	Trin.	Airy	Trin.
5 Freeman	Joh.	39 Shuttleworth	Caius	Boys	King's
6 Sharpe	Joh.	40 Buckley	Joh.	73 Edwards	Emm.
7 Bushell	Joh.	41 Abbott	Joh.	Jones	Trin.
8 Pattrick	Magd.	Cole	Christ's	Pierpoint	Joh.
9 Hiern	Joh.	Skinner	Trin.	Bagge	Trin.
10 Thomson	Joh.	44 Hawkins	Joh.	Singleton	Pemb.
11 Thompson	Trin.	45 Tillard	Joh.	78 Francis	Joh.
12 Kitchener	Trin.	46 Finlaison	Jes.	Flather	Joh.
13 Budd	Pemb.	47 Smart	Joh.	Hedges	Joh.
Gabb	Joh.	48 Dodd	Trin.	81 Townend	Trin.
Romilly	Caius	49 Fawcett	Trin.H.	82 Hoare	Joh.
16 Bechaux	Sidney	Corrie	Trin.	83 Venn	Caius
17 McDowell	Pemb.	Levin	Cath.	Maclachlan	Trin.
18 Cheyne	Joh.	Cooke	Joh.	Wilson, W.R.	Trin.
19 Mozley	King's	Hughes, W. O. F.	Emm.	86 Wilson, W.S.	Joh.
20 Hornby	Pemb.	54 Barclay	Trin.	87 Warlow	Joh.
21 Dalton	Caius	Newton	Joh.	88 Foster	Joh.
Davies	Trin.	Thomas	Trin.	Copestake	Christ's
Lane	Trin.	Clarence	Trin.	Hulbert	Caius
24 Rouse	Trin.	Richmond	Pet.	91 Peers	Cath.
25 Tomlin	Caius	59 Leach	Caius	92 Hughes, A.O.	Trin.H.
26 Channell	Trin.	60 Smith	Clare	93 Tanner	Corpus
Bradley	Caius	61 Dover	Jes.		
Scriven	Joh.	62 Edwards	Trin.		
29 Rippin	Joh.	Bull	Queens'		
30 Thurlbourn	Emm.	Shepherd	Trin.		
31 Valentine	Joh.	Thelwall	Trin.		
Griffith	Emm.	Robertson	Trin.		
Matthews	Joh.	Twentyman	Christ's		
34 Armitage	Emm.				

CLASSICAL TRIPOS, February, 1861.

EXAMINERS:

J. S. Wood, B.D., *St. John's College.*
Edward Balston, M.A., *King's College.*
W. M. Gunson, M.A., *Christ's College.*
W. J. Beamont, M.A, *Trinity College.*

CANDIDATES FOR THE CLASSICAL TRIPOS.

Abbot	Joh.	Borrett	King's	Bushell	Joh.
Airy	Trin.	Boulton	Trin.	Channell	Trin.
Athawes	Clare	Boys	King's	Churchill	Joh.
Austen Leigh	King's	Brown, J. E.	Joh.	Cleasby	Trin.
Benn	Joh.	Budd	Pemb.	Cobb	Trin.

Cornish	King's	Ingham	Trin.	Smith, G. V. V.	Caius
Crosse	Trin.	Kitchener	Trin.	Stephenson	Christ's
Dalton	Caius	Marsden	Queens'	Storr	Trin.
Davis	Caius	Mozley	King's	Straffen	Cath.
Dineley	Trin.	Newton	Joh.	Taylor, T.	Joh.
Dodd	Trin.	Nicholas	Joh.	Trevelyan	Trin.
Earle	Joh.	Northey	Trin.	Turnbull	Trin.
Edwards	Trin.	Pidcock	Corpus	Twentyman	Christ's
Forster	Trin.	Pierpoint	Joh.	Twist	Magd.
Geary	Corpus	Raban	Emm.	Valentine	Joh.
Gery	Emm.	Richmond	Pet.	Walsham	Magd.
Hardy	Christ's	Rowlands	Corpus	Warren	Joh.
Hedges	Joh.	Sanderson	Clare	Whalley	Trin.
Hoare	Joh.	Shepherd	Trin.	Yeoman	Trin.
Howard	Trin.	Smith	Clare		

By Mr. Gunson.

TRANSLATE into ENGLISH PROSE, and answer the questions appended to each passage:

A. Beginning, *Δοιαὶ μὲν Μενελάῳ ἀρηγόνες εἰσὶ θεάων, κ.τ.λ.*
Ending, *Ἔρδ' ἀτὰρ οὔ τοι πάντες ἐπαινέομεν θεοὶ ἄλλοι.*
HOMER, *Iliad*, IV. 7—29.

1. Analyse the words *ἀλαλκομενηΐς, φιλομμείδης, παρμέμβλωκε, φύλοπις, ἔχαδε, ἐπέμυξαν.* 2. Explain fully the construction *ποῖον τὸν μῦθον ἔειπες;* and shew by examples that it is equally compatible with the Attic idiom whether we regard *τὸν* as a mere definite article, or as a demonstrative pronoun. Give the full force of this predicative in the following passage: *δῶμά τ' ἔῤῥηξεν χαμᾶζε, συντεθράνωται δ' ἅπαν, πικροτάτους ἰδόντι δεσμοὺς τοὺς ἐμούς.* 3. Shew that *ἐπαινέω* bears its primitive meaning in this passage. Discuss Buttmann's derivation of *ἀκήν, ἀκέων.*

B. Beginning, *Ἔνθα θεοῦ χθονίου πρόσθεν δόμοι ἠχήεντες, κ.τ.λ.*
Ending, *καί ῥ' ὅστις ψεύδηται Ὀλύμπια δώματ' ἔχοντων.*
HESIOD, *Theogonia*, 767—783.

1. From what sources is Hesiod supposed to have derived the materials for his Theogony?

C. Beginning, *Ἔσχε τοιαύταν μεγάλαν αὐάταν, κ.τ.λ.*
Ending, *σπέρματος ἐνθορὸν αἴστωσεν ὕλαν.*
PINDAR, *Pythia* III. 24—37.

1. Account for the quantity of *αὐάταν* here. What are the primary meaning and original form of *ἄτη*? Has the periphrasis *λῆμα Κορωνίδος* any special reference to the usual application of this term? 2. Remark on the form *τόσσαις.* 3. Give the derivation and various meanings of *ἀμαιμάκετος.* 4. In what various forms does the root of *ἐπαΰρου* appear?

D. Beginning, ΧΟ. *Ὦ ποθεινὴ τοῖς δικαίοις καὶ γεωργοῖς ἡμέρα, κ.τ.λ.*
Ending, *καὶ τριαινοῦν τῇ δικέλλῃ διὰ χρόνου τὸ γήδιον.*
ARISTOPHANES, *Pax*, 556—570.

1. Illustrate the idiom *ἦν ἄρα.* 2. Does the last line but two admit of more than one rendering?

E. Beginning, ΑΙ. *Χώ, τι τὸ φάρμακόν ἐστιν ἀμαχανέοντος ἔρωτος, κ.τ.λ.*
Ending, *Λευκαίνων ὁ χρόνος. ποιῆν τι δεῖ, ἁς γόνυ χλωρόν.*
THEOCRITUS, XIV. 52—[illegible].

Does the 5th line require any emendation?

By Mr. Beamont.

TRANSLATE into ENGLISH PROSE:

ἐΠΕΙ δ' ἐπεμνησάμην ἀμειλίχων στρ. γ.
*πόνων,——ἄκαιρον δὲ δυσφιλὲς γαμή-
λευμ' ἀπεύχετον δόμοις
γυναικοβούλους τε μήτιδας φρενῶν
ἐπ' ἀνδρὶ τευχεσφόρῳ,
*ἐπ' ἀνδρὶ λαοῖς ἐπεικότως σέβας.
τίω δ' ἀθέρμαντον ἑστίαν δόμων,
γυναικείαν ἄτολμον αἰχμάν.
κακῶν δὲ πρεσβεύεται τὸ Λήμνιον ἀντ. γ'.
λόγῳ, γοᾶται δὲ δὴ πάθος κατά-
πτυστον. ᾔκασεν δέ τις
τὸ δεινὸν αὖ Λημνίοισι πήμασιν,
θεοστυγήτῳ δ' ἄγει
βροτῶν ἀτιμωθὲν οἶχεται γένος.
σέβει γὰρ οὔτις τὸ δυσφιλὲς θεοῖς.
τί τῶνδ' οὐκ ἐνδίκως ἀγείρω;
τὸ δ' ἄγχι πνευμόνων ξίφος στρ. δ'.
διανταίαν ὀξυπευκὲς οὐτᾷ
διαὶ Δίκας· τὸ μὴ θέμις γὰρ
*οὐ λάξ πέδοι πατούμενον
τὸ πᾶν Διὸς
σέβας παρεκβάντος οὐ θεμιστῶς.
Δίκας δ' ἐρείδεται πυθμὴν, ἀντ. δ'.
προχαλκεύει δ' Αἶσα φασγανουργός·
τέκνον δ' ἐπεισφέρει δόμοισιν,
*ἐκ δ' αἱμάτων παλαιτέρων
τίνει μύσος
χρόνῳ κλυτὰ βυσσόφρων Ἐρινύς.

ÆSCH. *Choeph.* 612—640.

Give various readings or emendations of the passages marked with asterisks.

Translate:

Beginning, Τοῦτ' ἐστὶν ἤδη κἀποθαυμάσαι πρέπον, κ.τ.λ.
Ending, στέρνων ἀραγμοὺς οὐδὲ παμμήκεις γόους.

SOPH. *Œd. Col.* 1586—1609.

By Mr. Wood.

TRANSLATE into GREEK TRIMETER IAMBICS:

Beginning, *Bishop of St. Andrew's.* These nobles and myself, &c.
Ending, In calmer waves the silly seaman strives.

R. GREENE'S *James the Fourth*, Act II.

Translate into GREEK ELEGIACS:

Beginning, In hell there is a tree, &c.
Ending, T' impose to such as faithless were to such as loved them well.

G. PEELE'S *Arraignment of Paris*, Act III. Sc. 5.

By Mr. Wood.

TRANSLATE, adding a brief note wherever a word, a construction, or an allusion may seem to require it:

1. Beginning, Οἱ δὲ Ἀργεῖοι καὶ οἱ ξύμμαχοι ὡς εἶδον αὐτοὺς, κ.τ.λ.
Ending, ὡς ἰόντες ἐπὶ τοὺς πολεμίους.—THUC. v. 65.

Describe the geogrsphical features of the district in which these operations took place, explaining the step to which Agis had recourse.

2. Beginning, Ἀλλὰ τοῦτο μέν, ἔφη, ὦ Σώκρατες, κ.τ.λ.
Ending, ταῦτα γράψαντες ἀνέθεσαν.—PLAT. *Charm.* p. 164 Steph.
3. Beginning, Ἀναγκαῖον τοίνυν ἐκ τῶν εἰρημένων τὰ μὲν ὑπάρχειν, κ.τ.λ.
Ending, τὰ δ' ἀκούοντες.—ARIST. *Polit.* VII. 13. 8—13.

ἔνια γάρ ἐστι διὰ τῆς φύσεως ἐπαμφοτερίζοντα διὰ τῶν ἐθῶν ἐπὶ τὸ χεῖρον καὶ τὸ βέλτιον. It has been proposed to read ἐστιν ἴδια. Discuss this or any other correction of the Text.

4. Beginning, Πλούσιοι πολλοὶ συνεστηκότες, κ.τ.λ.
Ending, μηδαμῶς· πάντα γὰρ τὰ αἴσχιστα ἔνεστιν ἐν τῷ πράγματι.
DEM. *c. Meid.* p. 582 *fin.*

ὅπως ἐπέξει τῷ μιαρῷ καὶ μὴ διαλύσει. διαλύσῃ Buttm. What have you to remark on the questions of orthography and construction suggested by this variation of reading?

Explain the nature of the προβολή—the meaning of the term, the provisions of the laws respecting it, the course of procedure consequent upon it.

By Mr. Balston.

TRANSLATE:

1. Beginning, Ἐπεὰν τὸν πρῶτον ἄνδρα καταβάλῃ ἀνὴρ Σκύθης, κ.τ.λ.
Ending, συῤῥάπτοντες κατάπερ βαίτας.—HERODOT. IV. 64.
2. Beginning, Ἐπιλαμβάνειν δὲ χρὴ ἵππου θυμοειδῆ, κ.τ.λ.
Ending, ὅσα τῷ θυμοειδεῖ χρῆσθαι συμβουλεύομεν.
XENOPHON, *De re Equestri*, IX. 8.
3. Beginning, Ὅτι δὲ ἄθλου προὔκειτο τῷ εὖ προεμένῳ τὸν κότταβον, κ.τ.λ.
Ending, ἀνῃρεῖτο δὲ τὰ κοττάβια ὁ πλείω καταδύσας.
ATHENÆUS, lib. XV. cap. 5.

Mention the varieties of this game, and cite passages from other authors in which allusion is made to it.

By Mr. Gunson.

TRANSLATE into GREEK PROSE:

1. Beginning, The losse of this armie was the ruin of the Athenian dominion, &c.
Ending, but every man was affraid of his neighbour, lest he should be a member of the league.—RALEIGH, part I. book III. chap. 9.
2. Beginning, And because the greatest part of men are such as prefer their own private good before all things, &c.
Ending, Theft is naturally punishable, but the kind of punishment is positive, and such lawful as men shall think with discretion convenient by law to appoint.—HOOKER, book I. chap. x. 6.

By Mr. Balston.

TRANSLATE with short explanatory notes where required:

1. Beginning, Proinde ubi se videas hominem indignarier ipsum, etc.
Ending, stansque iacentem se lacerari urive dolere.
LUCRETIUS, lib. III. 870—887.

Interfiat. Why remarkable? What law is observable in the compounds of facio both in form and declension? Account for the form eicit.

2. Beginning,
PH. Itane patris ais conspectum veritum hinc abiisse? GE. admodum. etc.
Ending, Mihi sciunt nihil esse. dices, ducent damnatum domum.
TERENTIUS, *Phormio*, Act. II. Sc. 2.

Comment upon oppido, eccere, cedo dum, enim.

3. Beginning, Si forte in medio positorum abstemius herbis, etc.
Ending, Italiæ pleno defudit Copia cornu. HORACE, I *Ep.* XII. 7—29.

Examine the word ultro, and illustrate its several meanings by other passages.

4. Beginning, Testor majorum cineres tibi, Roma, verendos, etc.
Ending, Turpior assessu non erit ulla meo.
PROPERTIUS, lib. v. *El.* xi. 37—50.

Render into ENGLISH VERSE or PROSE:

5. Beginning, Hæc ubi deflevit, tolli miserabile corpus, etc.
Ending, Non jam mater alit tellus, viresque ministrat.
VIRGIL, *Æn.* xi. 59—71.

Translate literally the last two lines, marking accurately the meaning of neque adhuc, nec dum, non jam.

By Mr. Wood.

TRANSLATE, with brief explanatory notes where required:

1. Beginning, Talia dicentem jamdudum lumine torvo, etc.
Ending, Oppugnant: manet illa, suoque est pondere tuta.
OVID. *Metam.* ix. 27—41.

2. Beginning, Justissima centurionum
Cognitio est igitur de milite: nec mihi deerit, etc.
Ending, Contra fortunam armati contraque pudorem.
JUV. *Sat.* xvi. 17—34.

3. Beginning, De prætoricia folium mihi, Paule, corona, etc.
Ending, Denique cum possis mittere, Paule, nihil.—MART. viii. 33.

By Mr. Balston.

FOR LATIN HEXAMETERS:
Beginning, Slowly they sail, slowly as icy isle, &c.
Ending, To sway their floating morris.—KEATS' *Endymion*, bk. iv.
For LATIN ALCAICS:
Beginning, The time admits not flowers or leaves, &c.
Ending, And sing the songs he lov'd to hear.
TENNYSON, *In Memoriam*, 106.

By Mr. Beamont.

TRANSLATE into ENGLISH PROSE:
Beginning, Inde, cum maxime vallum Romani jacerent, etc.
Ending, ita parati atque intenti hostium adventum opperiebantur.
LIVY, xxx. 10.

1. Describe the position of Utica, and mention the chief historical associations connected with it.
2. Give a sketch of the life of Scipio Africanus.

Beginning, Hæc populi oratio est, etc.
Ending, Quare noli me ad contentionem vestrum vocare, Laterensis.
CICERO, *pro Plancio*, vi.

1. What was the origin and constitution of the tribes at Rome? How did they vote?
2. State the provisions of the various laws "de ambitu."
3. Can you suggest any emendation in the passage beginning "nihil quod diribitio"?

Beginning, Non simplex autem circa suasorias error in plerisque declamatoribus fuit, etc.
Ending, ita quum verba rebus aptentur, ipso materiæ nitore clarescunt.
QUINTILIAN, *De Inst. Orat.* iii. 8. 58—61.

Beginning, Per idem tempus actum in senatu de fraudibus libertorum efflagitatumque, etc.
Ending, cujus jussu perpetratum ingenuitatis judicium erat.
TAC. *Ann.* xiii. 26, 27.

1. "Ille an auctor," Gualther. What other readings have been proposed?
2. Explain the nature of the relation between patronus cliens and libertus.

By Mr. Gunson.

TRANSLATE into ENGLISH:

A. Beginning, Libet intueri fiscos in angulo jacentes, etc.

Ending, Quanto risu prosequenda sunt, quæ nobis lacrimas educunt?—SENECA, *de Ira*, III. 33.

1. What is the derivation of the word *basilica?* When were basilicæ first built at Rome? For what purpose were they originally designed, and what has been their subsequent application? 2. Illustrate by examples the proper force of the verb *imputo*. 3. To what usage does *vadimonia* refer?

B. Beginning, Sensit et facies hominum novos, etc.

Ending, ni usque in ossa corpus exustum esset, rebellante tædio.

PLINY, *Nat. Histor.* XXVI. 1—3.

1. quæstorio scriba. What were the functions of the *scribæ* in the provinces? What do you infer from this passage as to their political rank and social status? 2. What do you understand by the *plebs media?*

C. Beginning, Tironem habeo citius, quam verebar, etc.

Ending, Mihi simulatio pro repudiatione fuerit. Τοῦτο δὲ μηλώσῃ.

CIC. *Ep. ad Att.* XII. 51.

1. What is the proper force of the particle *utique*, and how is it generally used by Cicero? Can you cite any example of *a* (*ab*) used as it is here (*a Peducæo utique*)? 2. Give the etymology and various applications of the word *repudiatio*.

By Mr. Beamont.

TRANSLATE *into* LATIN PROSE:

Beginning, The historian who is influenced by a sense of that justice which is due to the departed not less than to the living, will be mindful of the Divine precept,—"Judge not." &c.

Ending, its first suggestion is to acts of benevolence and kindness.

HOOK'S *Lives of the Archbishops of Canterbury*, vol. I. p. 5.

Beginning, The Negus gave audience in the open field, &c.

Ending, a formidable nation from whom they had never received any personal injuries.—GIBBON, vol. IV. p. 495.

HISTORY OF GREECE.

By Mr. Beamont.

[N.B. Dates are required in all cases.]

1. Καὶ τὴν μὲν ἐν Ἀρείῳ πάγῳ βουλὴν Ἐφιάλτης ἐκόλουσε καὶ Περικλῆς· τὰ δὲ δικαστήρια μισθοφόρα κατέστησε Περικλῆς.—ARISTOT. *Polit.* II. 93.

Explain the nature of the changes alluded to in this passage, and their political result.

2. Examine the religion of the Greeks, its character in the Homeric age, its influence on the drama. How was "the primitive religious faith subsequently disturbed by the intrusions of science"?

3. The affair of Pylos. Draw a map of the island of Sphacteria; shew the geographical difficulties of Thucydides' account, mentioning the leading circumstances of the whole affair.

4. Trace the operation of the causes which led to the decline of the Spartan Empire in the interval between the termination of the Peloponnesian War and the Battle of Leuctra.

5. Give a sketch of the history of Olynthus, keeping more especially in view its relations to the general history of Greece.

6. Describe the state of affairs in Greece at the death of Alexander; and give a brief account of the Lamian War and its results.

HISTORY OF ROME.

By Mr. Beamont.

1. GIVE an account of the wars of Rome and Samnium until the final subjugation of the latter.

2. Write the lives of (1) M. Livius Drusus, (2) of Cn. Pompeius.

3. Describe the constitution of the Roman army as given by Livy in his 6th Book. Mention any subsequent alterations. Compare the Roman legion with the Macedonian phalanx.

4. Expand the allusions contained in the following passages into distinct historical statements:

(*a*) Motum ex Metello consule civicum,
Bellique causas et vitia et modos,
Ludumque Fortunæ gravesque
Principum amicitias et arma.—HOR. 2 *Carm.* I. 1.

(*b*) Memineramus Cinnam nimis potentem, Sullam postea dominantem, modo regnantem Cæsarem videramus.—CIC. *Phil.* II. 42.

(*c*) Neque enim posset aut Ahala ille Servilius aut P. Nasica, aut L. Opimius, aut C. Marius, aut me Consule Senatus non nefarius haberi si sceleratos cives interfici nefas esset.—CIC. *pro. Milon.* 3.

(*d*) Jam atridunt ignes, jam follibus atque caminis
Ardet adoratum populo caput et crepat ingens
Sejanus: deinde ex facie toto orbe secunda,
Fiunt urceoli, pelves, sartago, patellæ.—JUV. X. 61.

(*e*) O bone num ignoras? missa est a Cæsare laurus
Insignem ob cladem Germanæ pubis, et aria
Frigidus excutitur cinis, ac jam postibus arma
Jam Chlamydes regum jam lutea gausapa captis
Essedaque ingentesque locat Cæsonia Rhenos.—PERS. VI. 43.

EXAMINED AND APPROVED.

FIRST CLASS.

Abbott	Joh.
Trevelyan	Trin.
Cornish	King's
Austen-Leigh	King's
Richmond	Pet.
Storr	Trin.
Twentyman	Christ's
Nicholas	Joh.
Stephenson	Christ's
Forster	Trin.
Cobb	Trin.
Warren	Joh.
Airy	Trin.

SECOND CLASS.

Kitchener	Trin.
Sanderson	Clare
Borrett	King's
Whalley	Trin.
Benn	Joh.
Earle	Joh.
Davis	Caius
Hedges	Joh.
Smith, G.	Clare
Turnbull	Trin.
Edwards }	Trin.
Ingham }	Trin.
Raban	Emm.
Budd	Pemb.
Northey	Trin.
Channell	Trin.
Bushell	Joh.
Mozley	King's
Churchill	Joh.
Athawes	Clare
Gery	Emm.
Dineley	Trin.
Crosse	Trin.
Twist	Magd.

THIRD CLASS.

Taylor	Joh.
Brown	Joh.
Smith	Caius
Cleasby	Trin.
Geary	Corpus
Boys	King's
Pierpoint	Joh.
Walsham	Magd.
Straffen	Cath.
Hoare	Joh.
Valentine	Joh.
Boulton	Trin.
Dalton	Caius

EXAMINATION FOR B.A. DEGREE, FEBRUARY, 1861.

EXAMINERS:

Mathematical.	JAMES MOURANT DU PORT, M.A., *Caius College.* JOHN FULLER, B.D., *Emmanuel College.*
Classical.	ROBERT BURN, M.A., *Trinity College.* JOHN WILLIAM TAYLOR, M.A., *St. Peter's College.*
Acts of the Apostles and Reformation.	EDWARD HENRY ROGERS, M.A., *King's College.* JOHN SMYTH PURTON, B.D., *St. Catharine's College.*

CANDIDATES FOR B.A. DEGREE.

Allen	Trin.	Hawkesworth	Trin.	Plaskitt	Joh.
Bagnall	Sid.	Hoare	Jesus	Powell	Clare
Baldock	Trin.	Hole	Christ's	Shilleto	Christ's
Beales	Joh.	Johnson	Queens'	Tamplin	Trin.
Carpenter	Sid.	Kemp	Joh.	Trench	Trin.
Cavill	Jesus	King	Trin.	Walker	Sid.
Davies, R. H. E.	Trin.	Knapp	Emm.	Webber	Trin H.
Durst	Emm.	Marwood	Pemb.	Webster	Trin.
Hampden	Trin.				

ALGEBRA.

1. WHAT do the signs $+$, $-$ and $\times$ signify? Are any further definitions or explanations necessary to enable you to interpret the expressions $a - b$, where $b > a$, and $-a \times b$?

2. Multiply together $27a^3 - 27a^2c^2 + 9ac^4 - c^6$ and $9a^2 + 6ac^2 + c^4$, and divide the result by $a^2 - \frac{c^4}{9}$.

3. Simplify the following expression:

$$1 - \frac{1 - 2ex + e^2}{1 - ex} + \frac{ex + e^2}{1 + ex}.$$

4. Divide $x^3 + x^2y + x^2z - xyz - y^2z - yz^2$ by $x^2 - yz$, and $x^4 - \frac{1}{y^4}$ by $x - \frac{1}{y}$.

5. When are four quantities said to be proportional in Algebra? If a, b, c, d satisfy this test, and $a + b + c + d = s$, shew that

$$s\{s - (b + c)\} = \{s - (a + c)\}\{s - (a + b)\}.$$

6. If four quantities are proportional according to the algebraical definition they are proportional according to the geometrical definition. Prove this, and explain the nature of the difficulty which arises in the proof of the converse proposition.

7. Solve the following equations:

$$(1)\quad \frac{x + 1}{2} - \frac{5 - x}{4} = 9.$$

$$(2)\quad \frac{1}{x - 6a} = -\frac{1}{a} + \frac{1}{x}.$$

$$(3)\quad \left.\begin{aligned} \frac{x^2}{y} - \frac{y^2}{x} &= 7, \\ x - y &= 2. \end{aligned}\right\}$$

8. If any six consecutive numbers be taken, the first of which is odd, the difference between the sum of the squares of the even and odd numbers is equal to three times the sum of the two middle numbers.

9. A person died leaving a certain sum to be divided equally between his two daughters (one of whom has married a Frenchman) and to be invested for their benefit in Consols and French 3 per cents respectively. The trustees bought the former at 92 and the latter at 68, and it was found that the latter investment produced £84 a year more than the former. Required the amount of the legacy (income-tax 10*d.* in the pound).

MECHANICS AND HYDROSTATICS.

1. Define weight. Explain clearly how statical forces are estimated and compared.

2. If two forces, acting perpendicularly at the extremities of the arms of any lever balance each other, they are inversely as the arms.

How may the magnitude and direction of the pressure on the fulcrum be determined?

3. If two forces acting at a point are represented in direction and magnitude by two sides of a parallelogram, the diagonal through the point will represent their resultant in magnitude.

Two given forces act at a point, within what limits can their resultant vary?

4. In the single moveable pulley when the strings are parallel, there is equilibrium when $W = 2P$.

Investigate the mechanical advantage in the Spanish Barton, the construction of which is as follows: A string fixed at one end passes under one and above another moveable pulley and the power acts at the other end. Of these two moveable pulleys the first supports the weight and both are connected by a string which passes over a fixed pulley attached to the same beam as the first string. Both strings are parallel.

5. Find the center of gravity of a triangle.

Any number of triangles are described on the same base and between the same parallels; on what line will all their centers of gravity be?

6. Explain clearly what is meant by the term "pressure at a point" of a fluid, and describe an experiment for proving that if the pressure at any point of a fluid be increased, the pressure at every other point will be equally increased.

7. If a body be immersed in fluid the resultant of the fluid pressures is vertical and equal to the weight of the fluid displaced.

Hence determine the conditions of equilibrium of a floating body.

8. Describe the Hydrostatic balance, and shew by means of it how to find the specific gravity of a solid which will not sink in water.

9. Prove that the pressure of the atmosphere is accurately measured by the weight of the column of mercury in the barometer.

How is the reading of the barometer affected by the temperature of the mercury at the time of the observation?

10. Explain the method of filling and graduating a common thermometer.

EUCLID.

1. Write down a list of the symbols which are not admissible in geometry, and give your reasons for excluding them.

2. Define a semicircle, a triangle, and an oblong.

When are two magnitudes said to be equal to each other?

3. The angles at the base of an isosceles triangle are equal to one another; and if the equal sides be produced, the angles upon the other side of the base shall be equal.

4. Bisect a given rectilineal angle, that is, divide it into two equal angles.

Divide a given right angle into three equal parts.

5. All the interior angles of any rectilineal figure together with four right angles are equal to twice as many right angles as the figure has sides.

Shew that any angle of an equilateral pentagon is to a right angle in the ratio of 6 to 5.

6. Equal triangles upon equal bases, in the same straight line, and towards the same parts, are between the same parallels.

Shew that in the figure for the proposition in the third question, the line joining the points taken in the sides produced is parallel to the base.

7. If a straight line be divided into two equal parts, and also into two unequal parts, the rectangle contained by the unequal parts, together with the square of the line between the points of section, is equal to the square of half the line.

8. Find the center of a given circle.

9. Draw a straight line from a given point, either without or in the circumference, which shall touch a given circle.

Point out the step in which the problem given in the previous question is employed in this one.

10. Cut off a segment from a given circle, which shall contain an angle equal to a given rectilineal angle.

11. The sides about the equal angles of equiangular triangles are proportionals; and those which are opposite to the equal angles are homologous sides, that is, are the antecedents or consequents of the ratios.

If from the vertex C in a triangle ACB, which has the angle ACB a right angle, a line CD be drawn perpendicular to AB, shew that CD is to AC as BC is to AB and as BD is to BC.

JUVENAL, SAT. III. AND X.

I. TRANSLATE the following passages:

(*a*) Torrens dicendi copia multis
Et sua mortifera est facundia.

What instances does Juvenal adduce in support of this assertion?

(*b*) Ridenda poemata malo
Quam te conspicuæ, divina Philippica, famæ
Volveris a prima quæ proxima.

Are any of the poemata of Cicero still extant? Against whom were the Philippics of Cicero directed? Why called Philippics?

(*c*) Prima fere vota et cunctis notissima templis
Divitiæ, crescant ut opes, ut maxima toto
Nostra sit arca foro.

Derive templum, cunctus; and distinguish between divitiæ, opes, and pecunia. Why *toto foro?*

(*d*) Da testem Romæ tam sanctum, quam fuit hospes
Numinis Idæi; procedat vel Numa vel qui
Servavit trepidam flagranti ex æde Minervam.

Explain the allusions in this passage. What especial distinction was granted to him "qui servavit, &c."?

(*e*) Exeat, inquit,
Si pudor est, et de pulvino surgat equestri,
Cujus res legi non sufficit.

What was the inferior limit of a Roman knight's income? To what "lex" is allusion here made? By whom introduced?

(*f*) Quam timeo, victus ne pœnas exigat Ajax,
Ut male defensus.

What different interpretations have been assigned to this passage? Which do you prefer?

(*g*) Romanus Graiusque ac barbarus endoperator.

Quote instances of illustrious generals here referred to.

(*h*) Vive bidentis amans et culti villicus horti,
Unde epulum possis centum dare Pythagoreis.
Est aliquid, quocumque loco, quocumque recessu,
Unius sese dominum fecisse lacertæ.

What were the peculiar tenets of the Pythagoreans? Explain and illustrate the expression "unius dominum lacertæ."

II. Translate: III. 140—153.

Beginning, Protinus ad censum, de moribus ultima fiet, etc.

Ending, Quam quod ridiculos homines facit.

Translate: x. 88—102.

Beginning, Hi sermones, etc.

Ending, Frangere pannosus vacuis ædilis Ulubris?

HERODOTUS. Book III.

1. Draw a map of Egypt, and indicate the position of the following places: Memphis, Thebes, Elephantine, the Lake Mœris, Patumos, Canopus, Pelusium, Sais, Heliopolis, Busiris.

Where was Herodotus born, and when did he live?

2. Translate: cap. 25.

Beginning, Ἐπεί τε δὲ στρατευόμενος ἐγένετο ἐν Θήβῃσι, κ.τ.λ.

Ending, ὁ μὲν ἐπ' Αἰθίοπας στόλος οὕτω ἔπρηξε.

(*a*) Parse ἐξανδραποδισαμένους, ἐμπρῆσαι, διεληλυθέναι, ἐπελελοίπεε, ἀπείς, καταβάς.

(*b*) Derive γνωσιμαχεῖν, ἀλληλοφαγίη.

(*c*) Give the Attic Greek for ποιεύμενος, ἀποπλέειν, ἔπρηξε.

3. Translate: cap. 98.

Beginning, Τὸν δὲ χρυσὸν τοῦτον τὸν πολλὸν οἱ Ἰνδοί, κ.τ.λ.

Ending, ὡς θώρηκα ἐνδυνέουσι.

(*a*) Parse εἰρημένον, ἴδμεν, ἀμήσωσι, καταπλέξαντες.

(*b*) Derive ψήγμα, ἀνατολαί, ὁμόφωνος.

(*c*) To what part of modern India did the India of Herodotus correspond? How does he describe the cotton plant?

4. Translate: cap. 129.

Beginning, Ἀπικομένων δὲ καὶ ἀνακομισθέντων τῶν Ὀροίτεω χρημάτων ἐς τὰ Σοῦσα, κ.τ.λ.

Ending, καὶ ῥάκεσι ἐσθημένον.

(*a*) Parse ἀνακομισθέντων, συνήνεικε, στραφῆναι.

(*b*) On what river was Susa? Has its position been accurately determined by modern travellers?

(*c*) Enumerate the principal Greek colonies in Southern Italy mentioned by Herodotus.

ACTS OF THE APOSTLES.

1. Translate: chap. i. 1—8.

Beginning, Τὸν μὲν πρῶτον λόγον ἐποιησάμην περὶ πάντων, κ.τ.λ.

Ending, καὶ ἕως ἐσχάτου τῆς γῆς.

(1) Illustrate the words *οἷς παρέστησεν...τῆς βασιλείας τοῦ Θεοῦ* from the Gospel.

(2) Relate the circumstances under which the Gospel was first preached in Samaria.

(3) Parse *ἐντειλάμενος, παρέστησεν*, and *ἔθετο*.

2. Translate: chap. ix. 10—16.

Beginning, *Ἦν δέ τις μαθητὴς ἐν Δαμασκῷ ὀνόματι Ἀνανίας, κ.τ.λ.*

Ending, *ὅσα δεῖ αὐτὸν ὑπὲρ τοῦ ὀνόματός μου παθεῖν.*

(1) Describe the situation of Damascus.

(2) Give some account of the life of Saul before his first missionary journey.

(3) Give the derivation of *μαθήτης, ἐξουσία*, and *ἐκλογή*.

3. Translate: chap. xiii. 46—50.

Beginning, *Παῤῥησιασάμενοι δὲ ὁ Παῦλος καὶ ὁ Βαρνάβας εἶπον, κ.τ.λ.*

Ending, *καὶ ἐξέβαλον αὐτοὺς ἀπὸ τῶν ὁρίων αὐτῶν.*

(1) Who was Barnabas?

(2) Explain *τὰς σεβομένας γυναῖκας*, and give the derivation of *εὐσχήμονας*.

4. Translate: chap. xvii. 1—9.

Beginning, *Διοδεύσαντες δὲ τὴν Ἀμφίπολιν καὶ Ἀπολλωνίαν, κ.τ.λ.*

Ending, *Καὶ λαβόντες τὸ ἱκανὸν παρὰ τοῦ Ἰάσονος καὶ τῶν λοιπῶν, ἀπέλυσαν αὐτούς.*

(1) Give some account of Thessalonica.

(2) Parse *εὑρόντες* and *ὑποδέδεκται*.

5. Translate: chap. xxiii. 26—30.

Beginning, *Κλαύδιος Λυσίας τῷ κρατίστῳ ἡγεμόνι Φήλικι χαίρειν, κ.τ.λ.*

Ending, *παραγγείλας καὶ τοῖς κατηγόροις λέγειν τὰ πρὸς αὐτὸν ἐπὶ σοῦ. ἔῤῥωσο.*

(1) What was the constitution of the Jewish Sanhedrim?

(2) Give the derivation of *κρατίστῳ* and *ἔγκλημα*.

HISTORY OF THE REFORMATION.

1. WHAT accident first brought Cranmer into notice? Give a short account of him.

2. Explain Mortmain, Præmunire, Annates.

3. Who were the Lollards, and why were they so called? Mention some of their most distinguished martyrs.

4. How did Bishop Tonstal unconsciously assist the Reformation by burning the Scriptures?

5. Who was John Lambert? What part did Cranmer take in his trial?

6. What was the date of the Six Articles? How did their adoption affect Cranmer? Did he at this time dissent from them all?

7. Explain the doctrine of the Church of England on the subject of the Sacrament of the Lord's Supper, and shew how it differs from the Roman Catholic and the Lutheran view.

8. What important results were gained by the Reformers during the Reign of Henry VIII.? What were the most important points of doctrine, which remained still unchanged?

9. Give a short account of the Sect of the Anabaptists.

10. What is meant by the Erastianism of the Church of England, and whence is the term derived?

EXAMINED AND APPROVED.

Baldock	Trin.	Hoare	Jesus	Plaskitt	Joh.
Beales	Joh.	Johnson	Queens'	Powell	Clare
Davies	Trin.	Knapp	Emman.	Shilleto	Christ's
Durst	Emman.	Marwood	Pemb.	Walker	Sid.

MORAL SCIENCES TRIPOS, February, 1861.

EXAMINERS:

W. Whewell, D.D., *Trinity College.*
Joseph B. Mayor, M.A., *St. John's College.*
Henry J. Roby, M.A., *St. John's College.*
Leslie Stephen, M.A., *Trinity Hall.*

CANDIDATES.

Humphreys	Trin.	Nixon	Corpus	Salts	Joh.

MORAL PHILOSOPHY.

1. Who are the interlocutors in the Meno? What is the course of the Dialogue? What the conclusion ostensibly arrived at? What do you conceive to be the real logical result of the Dialogue?

2. What is Plato's final ethical scheme in the Republic Bk. I.—IV.? How is it prepared in other Dialogues?

3. State Plato's Doctrine of Ideas. Give the objections to it as stated in the Parmenides. How are they answered there? Give Aristotle's objections to the Doctrine.

4. What is meant by the doctrine of 'Unchangeable Morality'?

5. What doctrine of this kind is expressed by Plato? by Cicero? by Clarke? by Cudworth?

6. How far are the statements of these Authors equivalent, and how far discrepant?

7. What is Paley's account of Virtue? What is his account of Happiness? How are they connected in him?

Pleasures, Interest, Happiness, Utility, Expediency. How does Paley use and apply these words?

8. Why am I obliged to keep my word? Compare Paley's account with other accounts.

9. What are the kinds of Imperatives: hypothetical, categorical, of Art, of Prudence, of Morality?

10. Exemplify the maxim 'act from Rules which may be universal,' in Self-murder: Borrowing when unable to pay: Exertion of our powers: Employment of wealth.

POLITICAL ECONOMY.

1. What is the meaning of Overproduction? Is there any real danger to be anticipated from it?

2. Consider the œconomical effect of absenteeism on the two countries concerned.

3. What are the chief arguments in favour of a system of peasant proprietors, and in what countries of Europe does that system prevail?

4. Give a careful statement of the law of wages as dependent upon the increase of population and capital. Within what limits can combinations between labourers or the employers of labour affect wages?

5. Describe shortly the general œconomical effect of the first discovery of gold in America. Is the same effect to be anticipated from the recent gold-discoveries, and what causes may prevent or retard that effect?

6. Explain what is meant by the 'Equation of International Demand,' showing under what circumstances two nations can carry on a mutually profitable trade in two specified articles.

7. Investigate the effect upon prices of the discovery of new gold-mines in one of two countries carrying on a free-trade with each other. Can prices remain permanently at a higher level in one of these countries than in the other?

8. Discuss the purpose and chief provisions of the Bank Charter Act of 1845.

9. Compare the chief advantages of Direct and Indirect Taxation.

10. Investigate the incidence of taxation in the case of Import Duties.

MENTAL PHILOSOPHY.

1. 'MAN is the measure of all things.' Who was the author of this maxim? What is its meaning? What arguments does Plato bring against it?

2 What account is given of sensation in the Theætetus? Shew that sensation is not the same as knowledge.

3. Explain and illustrate Aristotle's use of the words δύναμις, ἐνέργεια, ἐντελέχεια, shewing their importance in his general scheme of philosophy.

4. State and examine Aristotle's definition of ψυχή. What gradations of vital power are distinguished by him?

5. Give a historical account of the distinction between primary and secondary qualities, and discuss its correctness.

6. What is the doctrine of 'Innate Ideas' as understood by Locke, and how does he endeavour to disprove it? What appears to have been the meaning attached to the phrase by Descartes? How has that meaning been expressed by other writers? How far is the latter doctrine open to Locke's strictures?

7. What are the defects in Locke's account of the origin of our ideas? Give Cousin's remarks upon his account of the ideas of Space and Time.

8. Why does Locke argue against the supposition that the mind is always active in sleep? What are the arguments brought forward by him and how are they met by Sir W. Hamilton?

9. Give an account of the acquired perceptions of the sense of sight.

10. Explain and discuss the following: 'though sensation and perception exist only as they coexist, yet in the intensity of their existence they are always found in an inverse ratio to each other.'

HISTORY AND POLITICAL PHILOSOPHY.

1. WHAT are the principal opinions that have been held respecting the purpose and limits of Government? Give your own view.

2. State Aristotle's views of the proper employments for citizens. To what extent did such opinions generally prevail in Ancient Greece or Rome? What is there parallel in modern times? How would you define *citizenship* in ancient Rome, in the United States, and in England?

3. Define *Aristocracy*. Classify the modes of constituting an aristocratic body in different states.

4. What were the main burdens imposed by the feudal system upon vassals? Mention any country in which any of them are still retained.

5. Give a brief analysis of the Constitutions of some of the most important Legislative Assemblies, criticising their merits and defects.

6. Trace historically in some one country the political causes and effects of the changes undergone by the Judicial branch of the Government.

7. Describe the constitution *either* of the United States of America, *or* of the first French Republic, *or* of the present French Empire.

8. Contrast the establishment or recognition of religion by the State

in Rome in Cicero's time, in England before the Revolution, and in England at the present day.

9. Give Aristotle's analysis of the causes of political revolutions, adding illustrations from modern history.

JURISPRUDENCE.

1. What fundamental principle does Grotius assert in his Prolegomena, and what does he reject? Give some of his arguments.

2. 'Bellum est contentio publica, armata, justa.' Grotius's definition differs from this: how and why?

3. How does Grotius prove that war may be lawful? What classes of opponents does he argue against?

4. What are the kinds of sovereignty, and how does the distinction bear upon the question of war?

5. What is Grotius's account of the origin of property?

6. Is there a right of passing through the territory of another state? Of staying there? Of buying there? Of selling there?

7. What is Dereliction? Usucaption? Prescription? and the consequences of each?

8. What are the kinds of succession to sovereignty—patrimonial—hereditary—by consent of the people—feudal—lineal—cognatic—agnatic?

9. To what kind belongs the succession of Richard II. of England to Edward III?

LOGIC.

1. Give your definition of Logic. Discuss the question whether it be an art or a science.

2. Distinguish between Pure, Applied, and Modified Logic: and examine how far some one or more treatises on Logic preserve or confuse the distinctions.

3. What are the four fundamental laws of thought or logical Axioms? What is the relation between them? Are they equally entitled to their place? What division of Syllogisms is determined by them?

4. Explain the terms Presentation, Representation, Notion, Concept, Perception, Imagination, Idea: both the sense in which you use them yourself and that in which leading philosophers have used them.

5. Illustrate fully the opposition between the *Comprehension* and *Extension* of a notion. Shew what use has been made of it by different Logicians, and mention some of the terms employed by Aristotle and others to denote it.

6. Define genus and species. What is Aristotle's classification of the Predicables?

7. What is meant by the Categories? Explain briefly the categories of Aristotle, Kant, and Mill.

8. Explain the *modality* of a judgment as understood (1) by Aristotle, (2) by some post-Aristotelian Logicians. Discuss its place in Logic.

9. State the doctrine of the division of judgments according to their quantity (1) as held by old Logicians (2) as introduced by Sir W. Hamilton.

10. What is the logical doctrine of Conversion? and what is its use?

11. Explain the meaning of Syllogistic mood and figure: and shew the general principles on which only certain moods are admitted in each figure.

MORAL PHILOSOPHY.

1. State and discuss Aristotle's account of Virtue, and the exceptional cases noticed by him.

2. Give an account of the different qualities which have gone under the name of Courage. How is it defined by Plato and by Aristotle?

3. State the different meanings of the word 'Justice' as they are given by Aristotle.

4. State fully Aristotle's theory of Pleasure, and compare it with any others with which you may be acquainted.

5. What ancient school made it their maxim 'to live according to nature'? How was it explained by them? how by Bishop Butler?

6. Mention some of the Stoic Paradoxes with the arguments by which they were supported.

7. Draw out as distinctly as you can Butler's analysis of the human mind. In what respects is it defective?

8. 'Self-love is the sole spring of human action.' State as strongly as you can the arguments by which this doctrine has been assailed and defended.

9. Give instances of Butler's use of the argument from Final Causes, and state what is the origin of the term.

10. Give an account of the two kinds of Resentment, their occasions, offices, and abuses.

HISTORY AND POLITICAL PHILOSOPHY.

1. What are the three kinds of Government distinguished by Montesquieu, and what does he assume to be the principle of each and its natural corruption? How does he account for the origin and chief peculiarities of the English Constitution?

2. Describe the essential elements of the Feudal System. At what periods, and in what countries was that system most fully developed?

3. To what extent does Guizot suppose that the Feudal System had its origin in the peculiar organisation of the German tribes?

4. What was the relation of the Papal power to Charlemagne and his successors?

5. What permanent results may be ascribed to Charlemagne's empire?

6. Describe the most probable origin and the chief results of the Institution of Chivalry.

7. What does Guizot consider to be the essential principle of Representative Government, and how is it illustrated in the English Constitution?

8. Explain the theory of the Social Contract, and point out its defects.

9. At what period and under what circumstances does the English parliament first appear? When do Knights of the Shire and Burgesses respectively first seem to have had seats?

10. Discuss the economical and political effects of the dissolution of the English Monasteries.

MENTAL PHILOSOPHY.

1. Explain clearly Kant's theory of the nature of Space and Time, and contrast it with that of the Sensational School.

2. How does Kant prove that the Intuitions of Sense are subject to the categories?

3. State and examine Kant's doctrine of our having no direct cognition of self.

4. Examine Kant's refutation of Idealism.

5. What are the three Ideas of the Pure Reason? What does Kant understand by Rational Cosmology? How does he endeavour to establish the possibility of a Freedom in harmony with the Law of Natural Necessity?

6. Into what higher principles has Causality been analyzed by different philosophers? Which, if any, of the theories you mention appears to you to be well founded?

7. By what criterion and on what grounds has it been proposed to distinguish truths which are not derived from experience?

8. What different accounts have been given of the Laws of Association of Ideas? Give Sir W. Hamilton's criticism of them.

9. What was the nature and purpose of the theories of occasional Causes, and a Pre-established Harmony?

10. What does Reid understand by the theory of Ideas? How does he answer Hume's argument against the immediate perception of external objects?

POLITICAL ECONOMY.

1. Give a definition of Political Economy and explain what is meant when it is said to be a deductive science.

2. Point out the errors of the Mercantile system.

3. Classify the different kinds of Productive Labour.

4. Define Capital. In what ways does it contribute to Production? Give a brief explanation of the fundamental propositions respecting it.

5. Discuss the correctness of the distinction which has been drawn between Productive and Unproductive Expenditure; and compare the economical effects of the two in the following cases:

(1) A Pyrotechnist retiring from business applies that part of his income which he has been accustomed to use as capital, to the maintenance of infirm and aged persons.

(2) *A. B.* who has been in the habit of spending a certain sum yearly in the purchase of lace and velvet, now pays that sum in wages for the laying out and improvement of pleasure-grounds.

6. Compare the advantages of Production on a large, and on a small scale.

7. Is the introduction of Machinery to the advantage of the workman or otherwise?

8. Examine the following proposition: 'to assert that the agency of natural powers adds to the value of commodities, is to confound utility and value.'

9. Amongst whom is Produce naturally distributed? State (generally) what determines the proportion assigned to each party.

10. Give a short account of the chief Socialist schemes, discussing the justice and expediency of each.

LOGIC.

1. What is the method of *Dichotomy?* Its advantages? The opinions of Plato and Aristotle upon it?

2. What is Bentham's use of it?

3. Can thinking proceed without articulate words? can it proceed without any signs?

4. What is Intuition? What is *an* Intuition?

5. What are the opinions about the origin of Language, and the reasons for each?

6. 'Logic is the closed fist, Rhetoric the open hand.' Is this illustration just? How so, or how not so?

7. All jests are Fallacies. Is this true?

8. Give Bacon's first Aphorism, 'Homo naturæ interpres,' &c. and explain the force of each word.

9. 'Man is the Interpreter of Nature, Science the Interpretation, Idea the Characters.'

Explain the different purpose of this and of Bacon's first Aphorism.

10. The two processes by which Science is constructed, are explication of conceptions and colligation of facts.

Explain this. How far is it recognized by Bacon?

11. Bacon relies upon a new kind of Induction for the progress of Science. What kind does he mean, and how far has his expectation been justified?

HISTORY AND POLITICAL PHILOSOPHY.

1. MENTION the principal occurrences in the Long Parliament previously to the arrest of the Five Members.

2. What were the chief provisions of the Petition of Right under Charles I. and the Bill of Rights under William and Mary?

3. What improvements were made under William III. (1) With regard to the Law of Treason, (2) With regard to Religious Toleration?

4. Describe the nature and causes of the increased power of Parliament since the Revolution.

5. To what legislative enactments and other causes may the Liberty of the Press in England be attributed?

6. Define *slavery*. Contrast the state legal and actual of slaves in the United States of America, with Roman slaves, the *coloni* of the later Roman Empire, English villains, and Russian serfs.

7. Give a summary of the ideal Republic projected by Plato (in the Republic). Point out in what respects particularly it reflected the customary political views of the period, and what was the ground of Plato's dissent from existing governments.

8. What is Plato's classification of governments? What is in each the principle of transition? Compare Aristotle's doctrine, and criticize both.

9. Describe the system of administrative centralisation as it existed in France in the eighteenth century, and shew its relations to the Revolution.

10. Describe the main principles of local self-government as seen in England or in New England at the present day.

MORAL PHILOSOPHY.

1. WHAT are the several springs of Human Action, according to Dr. Whewell? How far does this agree with Stewart?

2. What is Dr. Whewell's classification of Duties? How far does it agree with previous classifications?

3. What are the characters which belong to the Idea of the State?

4. What are 'cases of Necessity'? Can they be decided, and how?

5. What are 'things allowable'? Do they exist in perfect moral action?

6. Shew by examples the variety of moral sentiments which have existed at different times and in different places. Is this conclusive against innate ideas of Right and Wrong?

7. Illustrate and investigate the following: 'Habit diminishes the liveliness of our passive impressions and strengthens our active determinations.'

8. Is it the action or the affection which is the object of moral approbation?

9. 'Pretended consciousness of Free-will amounts to nothing more than forgetfulness of motive.' Explain this and discuss its truth. State the facts which have been adduced on either side in the Necessitarian Controversy.

10. Describe the developement of the several principles of action in the individual, marking the chronological order of their appearance.

JURISPRUDENCE.

1. GIVE a brief estimate of the influence exercised by Bentham (1) upon scientific Jurisprudence, (2) upon practical legislation.

2. What are the main heads of Bentham's analysis of *acts*, *circumstances*, *intention*, *consciousness*, and *motive* in relation to punishable offences?

3. Criticise the above doctrine, comparing it with any other philosophical treatment, or actual code of legislation.

4. State and discuss Bentham's principles with regard to the proportion to be observed between punishments and offences.

5. Give a sketch of Bentham's treatment of *offences against trust.*

6. How does Bentham in his Principles of the Civil Code distribute the functions of the law in general? Which is to predominate in case of conflict, and why?

7. State and examine the most important *pathological* principles upon which the advantage of equality is said by Bentham to depend.

8. Analyse and justify the causes of 'invalidity in exchanges' (cases of invalid contracts).

9. Examine Bentham's views of marriage.

10. State precisely Bentham's application of the principle of utility, distinguishing its relations to morals and to legislation.

LOGIC.

1. DISTINGUISH between real and nominal definitions and examine Mr. Mill's doctrine.

2. Discuss the functions and value of the syllogism.

3. Contrast Sir W. Hamilton's doctrine of the Inductive and Deductive syllogism with the ordinary doctrine. Explain the relation of what is called Baconian Induction to the formal process.

4. Examine the use and legitimacy of hypothesis in scientific investigation.

5. What is the meaning of Analogy? Estimate the worth of Analogical Evidence.

6. What distinction does Mr. Mill draw between Induction and Description? Is it applicable in the actual history of Science?

7. What are the four methods of Inquiry in Science proposed by Mr. Mill? and how far do they apply in the actual history of Science?

8. What are the grounds of Mr. Mill's hope from Deduction rather than Induction in the future history of Science?

9. Mr. Mill does not consider the true prediction of hitherto unobserved phenomena as a strong confirmation of scientific discovery. Discuss this point.

POLITICAL ECONOMY.

1. WHAT is A. Smith's analysis of the advantages derived from the Division of labour? Supply any deficiencies in it.

2. What was the nature of the systems described by Smith as the 'agricultural systems'?

3. Give a short account of the objects and organization of the Bank of Amsterdam.

4. Investigate fully the effect upon corn and money rents of the imposition of Tithes.

5. What are the properties which especially qualify the precious metals to be used as money? What are the objections to a double standard?

6. How far is it true that the interests of the Capitalist and the Labourer are antagonistic?

7. State and examine Malthus' Theory of Population.

8. What is Ricardo's Theory of Rent? State and examine the objections which have been made to this.

9. What determines the comparative rate of Wages in different employments?

10. State the arguments in favour of the *Laissez faire* principle. With what limitations should this be accepted?

JURISPRUDENCE.

1. EXAMINE the meaning and application of the term *Natural Law*.

2. Discuss the origin and basis of the right of property, with a brief examination of different metaphysical and social theories on the matter.

3. Point out the main modifications in legislation on property required by its nature, *e. g.* as real or personal.

4. What *intrinsic* divisions may be made of the right of property in land? Define *eminent domain*, *usufruct*, *servitude* (easement), *pledge*, *fief*, *use*, &c.

5. Distinguish between crimes and torts; and discuss some of the cases on the border line.

6. What is the main point in controversy between the *philosophical* and the *historical* school of jurisprudence? Give an account of the controversy and of the arguments used on each side.

7. What are the arguments for codification? What the difficulties? How far have they been overcome in England? in France? in Germany?

8. What are the reasons why Marriage is a sacred Ceremony?

9. Give the history of the law of Divorce in England and in France.

MENTAL PHILOSOPHY.

1. STATE and discuss Cousin's classification of Philosophical Schools.

2. How does Locke classify ideas considered with regard to their qualities?

3. Illustrate the following proposition, and state and examine the inferences drawn from it by Locke: 'All words are ultimately derived from such as signify sensible ideas'?

4. How far is it true that 'knowledge consists in the perception of a relation between two ideas'?

5. Give an account of the Nominalist and Realist controversy, stating the subject in dispute, the chief writers, and the main arguments on both sides.

6. What are the three proofs of the existence of God mentioned by Kant? Give his criticism of them.

7. Give Sir W. Hamilton's classification of the various opinions on the doctrine of Perception. To which classes do the opinions of Descartes, Reid, and Kant belong?

8. On what grounds has the Scotch Philosophy been known as the Philosophy of Common Sense? What different meanings may be attributed to that expression?

9. Give an account of the nature of Abstraction and Generalization.

10. Examine Reid's theory of Consciousness as a separate Faculty.

WRITE an Essay on *one* of the following subjects:

1. The relative importance of Inductive and Deductive methods in the Moral Sciences.

2. The distinction noticed in Milton's lines:

> The soul
> Reason receives, and Reason is her being
> *Discursive* or *Intuitive;* discourse
> Is oftest yours, the latter most is ours,
> Differing but in degree, of kind the same.

3. The influence of land tenures on the progress of society, regarded as well in their economical as in their general political effects.

4. A comparison of the principles on which different nations have formed their law respecting the succession to property vacant by death.

WRITE an Essay on *one* of the following subjects:

1. The influence of Ethical writers on the world.
2. The connection and respective boundaries of Psychology and Physiology.
3. The influence of race on the political development of a nation.
4. The mutual bearings of the subjects embraced in the Moral Science Tripos.

HISTORY OF PHILOSOPHY.

1. How far is Plato indebted to previous Philosophers?
2. Show the importance of the Sophistical æra in the progress of Greek speculation. For what reasons, and by what method did Socrates oppose the Sophists?
3. What are the main distinctions between ancient and modern views of Ethics?
4. Give the names and dates of the most distinguished Schoolmen. On what grounds are they attacked by Bacon? What are the chief merits of the Scholastic Philosophy?
5. How did the rise of the Baconian Philosophy influence the writings of Moralists?
6. What were the Metaphysical systems prevalent in England at the publication of Locke's Essay? How was the Essay received and answered at the time?
7. Trace the progress of Metaphysical speculation from Locke to Kant.
8. Give a brief sketch of Fichte's philosophical system, and shew its relation to the systems which preceded and followed it.
9. Give an account of the re-action against the Sensationalist school in France.
10. How was Paley's system of Moral Philosophy received and answered at the time?
11. To what extent do the opinions prevailing in England at the present day bear the impress of Bentham, or of Coleridge?

EXAMINED AND APPROVED.

First Class	Second Class		Third Class	
	Salts	St. John's	Nixon	Corpus
	Humphreys	Trinity		

NATURAL SCIENCES TRIPOS, March, 1861.

EXAMINERS:

George Edward Paget, M.D., *Caius College.*
John Stevens Henslow, M.A., *St. John's College.*
William Hallows Miller, M.A., *St. John's College.*
George Downing Liveing, M.A., *St. John's College.*

CANDIDATES.

Barnard Emm. | Bradford Cath. | Townsend Trin.

1. Explain how to test the accuracy of a Thermometer, both in its fixed and intermediate points.

2. How does Solution differ from Chemical Combination? What reasons are there for supposing that Sulphuric Acid and water combine chemically, and that in more than one proportion?

3. Write down the symbols of all the faces of the hemihedral form with parallel faces $\pi 012$ in the cubic system. Point out the planes by which this form can be divided symmetrically.

4. Enunciate the Law of Symmetry in a crystal of the oblique system.

5. In which system has a simple form 2, 6, 12 faces?

6. Define what is meant by the characteristic fossils of a formation, and name those of the Lias.

7. Name orders in which the stipulation of leaves is an ordinary character.

8. What œconomic products of importance are obtained from Linaceæ, Leguminosæ, Labiatæ, and Coniferæ?

9. Inspect the Insects marked *A*, *B*, *C*,...., and refer them to their respective orders.

10. Compare the lowest animals with the lowest vegetables, indicating their resemblances and differences.

11. Describe generally what is known of the circulation of the blood in Insects. How is the sluggishness of their circulation reconcileable with the fact of their remarkable activity?

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12. Describe the methods of preparing Sulphurous acid, a *Hypo-Sulphite*, and a *Hypo-Sulphate*. Give the formulæ of the corresponding combinations with Baryta.

13. Examine the substances marked *A*, *B*, *C*,.... with the blow-pipe, and by heating in glass tubes. State distinctly the result of each experiment and your inference from it.

14. Enumerate the groups into which rocks of supposed igneous origin have been divided. Mention the essential constituents of Granite, Protogine, Gneiss, Mica-slate, Trachyte, Diorite, Dolerite. Describe the observations of Sorby which indicate the agency of water at a high temperature in the crystallizations of the minerals constituting granite, and the experiments of Rose which show that granite is not the result of igneous fusion.

15. Name the substances sublimed in the tubes *M*, *N*, *O*....; and the substances heated or fused with re-agents marked on the labels in the tubes *U*, *V*, *W*...

16. Arrange in a column, in order of superposition and under their geological periods, the following 14 formations. Assign to each its co-ordinate formation on the Continent of Europe.—Wenlock Limestone; Plymouth Limestone; Kimmeridge Clay; Cornbrash; Coral Rag; Magnesian Limestone; Thanet Sands; Portland Beds; Llandeilo Flags; Red Crag; Purbeck Limestone; Millstone Grit; Gault; Marlstone.

17. Describe the formation of Atolls.

18. Mention and define the kinds of fruit observed in Rosaceæ; and name the tribes in which each kind occurs.

19. Describe the nutritive and reproductive organs of Musci and Equisetaceæ.

20. Give a concise description of those animals which make up the series of transitional forms between Reptiles and Fishes.

21. Describe the stinging apparatus of a Bee.

22. Explain the term Archetype as used by Owen. Give examples (1) of homologous organs which in different animals perform diverse functions. (2) of organs which, though not homologous, discharge the same or analogous functions.

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23. DESCRIBE and explain the action of the electrophorus.

24. State the constitution of the atmosphere and how the several components are detected. Explain how a eudiometrical analysis of atmospheric air is made. How does the presence of moisture affect the determination, and how may any error on this account be easily avoided?

25. Name the minerals *A*, *B*, *C*,.... Mention the systems to which they respectively belong. Point out the occurrence of twin crystals, and of the observable cleavages; and describe the lustre of each.

26. Mention the essential constituents and the systems of crystallization of the following minerals: Cinnabar, Olivine, Malachite, Brookite, Libethenite, Hauerite.

27. Give the distinctive characters of the Shell, Sutures, and Siphuncle of the six following chambered Cephalopoda, and state the geological range of each genus: Nautilus, Orthoceras, Goniatites, Ammonites, Scaphites, and Hamites.

28. Describe the effects produced by Glaciers and Icebergs, and shew how they afford proofs of a Glacial Period in our latitudes.

29. Describe the usual internal structure of Leaves; and the chief modifications observable in their Epidermis.

30. Describe the functions of the Leaf.

31. State the chief distinctive characteristics of the five general types on which animals are constructed.

32. Describe the nervous system in the Asteriadæ and in the common Earth-worm.

33. Describe the ordinary type of the respiratory apparatus of fishes. Explain its mechanism, and its superiority in functional activity over that of any of the aquatic invertebrata. Why do fishes in general speedily die if removed from the water?

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34. THE substance *A* contains one acid and two bases which you are required to determine.

35. The substance *B* contains no bases which are precipitated by hydrosulphuric acid when the solution is acidified with a mineral acid: determine what bases it does contain.

36. Find the acid in each of the substances *C*, *D*.

N.B. *In answering the foregoing questions, each experiment tried is to be mentioned, the result of it and the conclusion drawn from it, and finally the conclusion drawn from the whole.*

37. State the substance of De Senarmont's explanation of the difference of the angle between the optic axes in mica and also in topaz; and give an account of the experiments on which this explanation is founded.

38. Describe the volcanic products *G*, *H*.

39. In what way has Elodea canadensis (Anacharis Alsinastrum of

Babington) become so abundantly diffused within the very few years it has been observed in Britain: as we have only the female plant in this country? Are any of our native aquatics increased in the same manner?

40. Compare the brain of a mammal with the chain of ganglia which represents it in fishes.

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41. State the reactions of Nitric Acid with (1) Zinc, (2) Ammonia, (3) Hydrosulphuric acid, (4) Calomel.

42. Name the systems of the crystals represented by the models *A*, *B*, *C*.... ; the hemihedral forms that occur; the number of simple forms of which each is a combination; and the number of faces in each simple form.

43. Distinguish the cases in which colour may be safely used aa a character for discriminating minerals from those in which it fails. Point out the precautions which must be employed in fixing the meaning of the names of colours proposed by Werner.

44. Mention the strata of the secondary system in which mammalian remains have been found, and assign to each stratum the genera which have been found in it.

45. Name the species of the British fauna known to have become extinct, since the period of the Boulder-clay.

46. Name the mineral substances most abundantly distributed in sedimentary rocks. Which of them occur in nodular and concretionary states?

47. Suppose the divergence of the fundamental spiral on a cone to be determinable from observations on 8 dextrorse and 5 sinistrorse secondary spirals, what will it be? Explain how you arrive at the conclusion.

48. What Organs have been observed to assume the condition of Tendrils? State an example of each kind.

49. Give instances (1) of animals of the same or closely allied species existing naturally under very diverae external circumstances, (2) of animala the distribution of which is limited to particular geographical areas.

50. Name the bone marked (x). With what other bones is it articulated; and what purpose does it serve? Illustrate its use by examples of its presence, absence, and varieties in different species of mammals.

51. Are the movements of the Hydra and other polyps to be regarded as voluntary? Give reasons for your opinion.

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52. Explain, and illustrate by other facts the following facts: (1) that a wall in sunshine is hotter than the neighbouring air, (2) that the heat of the sun may be easily concentrated by a burning glass, but not that of a common fire.

53. Explain how the equivalent of chlorine is determined.

54. Define a zone, and find the indices of a face common to two zones in terms of the indicea of the zones.

55. Describe the processes by which Daubrée formed crystals of quartz, felspar and spinelle.

56. Explain the principles of Lyell's classification of Tertiary strata, and point out the precautions requisite in applying them.

57. Under what circumstances are the coal measures supposed to have been deposited?

58. Give an account of the Fossil Flora of the Portland beds.

59. In which of the following Orders do albuminous and exalbuminous seeds occur? Violaceæ, Alismaceæ, Rosaceæ, Umbelliferæ, Ranunculaceæ, Oleaceæ, Cupuliferæ, and Leguminosæ.

60. Examine the skeleton placed on the table. State the class and order of the animal, and what you know of its habits. Point out also its principal relations to other orders and classes.

61. Describe the type of the nervous system in Articulated animals. Describe and explain the movements which have been observed in a centipede when a portion of its nervous chord has been removed from the middle of its trunk.

62. Give a concise general account of the power of evolving heat possessed by different classes of animals; and shew by a comparison of different groups, and of the same animals under different circumstances, that the heat evolved is proportionate to the perfection and activity of the respiratory process.

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63. EXPLAIN how to prepare pure nitrate of silver from standard silver.

64. What is fractional distillation? Explain how one of a mixture of two volatile substances may be separated by this means, and give examples of the application of this method.

65. In the rhombohedral system find the angle 111, *hkl* in terms of the angle 111, 100; and shew that the faces in the zone 111 are perpendicular to the face 111.

66. Shew that pyrite, galena, and quartz have been found associated with substances of such a nature as to preclude the supposition that they were in those cases crystallized at a very high temperature.

67. Point out the principal causes which affect the climate of a district, and how they affect it; and how movements in the earth's crust cause the climate of any particular district to vary from time to time.

68. What indications at the surface would lead you to suspect a fault?

69. Describe the specimens *A*, *B*, *C*, *D*, confining yourself to such of the following particulars as can be observed on them:

(1) *Leaves.* Position: Insertion: Arrangement: Form: Stipulation.

(2) *Inflorescence.* Character: Bracteation.

(3) *Flower.* Each of the Floral whorls, in respect of the numerical relation of the organs, their insertion, and form. Placentation and inversion of the ovules, unless too inconspicuous for ready observation.

(4) Natural Class and Order: stating reasons for determining the latter.

(5) Geographic distribution of the Order.

(6) Economic products of importance in the Order.

70. Discuss the question whether the Dog and Wolf should be regarded as of the same or different species.

71. Describe the Electrical Organs of the Torpedo, and the conditions for their action. What very remarkable peculiarity has been observed by Bilharz in the nerve which supplies the electrical organ of the Silurus?

72. In what respects do *capillary vessels* differ from small arteries and veins? Describe the process of their development in growing parts or in the repair of injuries.

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73. EXPLAIN fully how you would proceed to make an analysis of Acetic acid; and to determine a rational formula for the same.

74. Explain the preparation of ferrocyanide and ferricyanide of potassium. Shew the propriety of these names. When a given volume of cyanogen vapour is transmitted through a glass tube containing oxide of copper and ignited, what are the volumes and nature of the resulting gases?

75. Measure the angle between the marked faces of the crystal cemented to the axle of the goniometer.

76. Enumerate the principal minerals which enter into the composition of meteorites. How does Joule account for the high temperature they possess on reaching the surface of the earth?

77. Enumerate the varieties of metamorphism observed in rocks. Shew

by reference to examples that metamorphic rocks are of various ages, and explain why they are more abundant among the older rocks.

78. Name the metamorphic specimens *X*, *Y*, and state their chief British localities, and the rocks with which they are associated.

79. Describe the specimens *E*, *F*, *G*, *H*, confining yourself to such of the following particulars as can be observed in them.

(1) *Leaves.* Position : Insertion : Arrangement : Form : Stipulation.

(2) *Inflorescence.* Character : Bracteation.

(3) *Flowers.* Each of the floral whorls, in respect of the numerical relation of the organs, their insertion, and form. Placentation and inversion of the ovules, unless too inconspicuous for ready observation.

(4) Natural Class and Order : stating reasons for determining the latter.

(5) Geographic distribution of the Order.

(6) Economic products of importance in the Order.

80. Describe generally the groups of animals which form connecting links between Mollusca and Zoophytes.

81. Indicate the chief bodily characteristics of man as compared with other animals, particularly with the apes which approach him most closely.

82. Describe the blood corpuscles of mammals (adult and embryonic), and compare them with the blood corpuscles in other classes of vertebrate animals. Has any relation been observed between the size of animals and that of their blood-corpuscles ?

Examine under the microscope the specimens of blood-corpuscles marked *A*, *B*, *C*, and determine the Classes of the animals to which they respectively belong.

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83. What is the relation between the vapour volumes and equivalents of bodies ? Explain how the vapour density of a volatile liquid is determined.

84. Refer to their chemical *types* Olefiant gas, Kakodyl, Ether, Fousel oil, Aldehyd, and give the chief analogies which lead to this reference.

85. Correct the following statements which recent observations have proved to be erroneous, that Graphite and Ripidolite (of von Kobell) are rhombohedral, that Datholite is prismatic, that Autunite (yellow Uranite) is pyramidal, that Boracic acid and Magnesia are the only essential constituents of Boracite, and that Silica, Alumina, and Glucina are the only essential constituents of Euclase.

86. What difference is there between the magnetic properties of different varieties of Fe_2O_3 ?

87. State the mean density of the earth, and explain distinctly how it is determined.

88. Explain the grounds for the three great divisions of fossiliferous rocks.

89. Describe the specimens *I*, *J*, *K*, *L*, (Fruits and Seeds), noticing each integument, and other subordinate parts capable of being determined by inspecting the Fruit, Seed, and Embryo separately.

90. Refer the cryptogamic specimens *a*, *b*, *c*.. to their orders.

91. Mention instances of Plants which exhibit sensible movements analogous to the movements in the higher animals. Define the limits within which the analogy holds, and point out where it fails.

92. Describe the processes of formation, detachment and renewal of Antlers. Describe also the other kinds of horns which grow on the heads of Mammals.

93. Describe the stomachs of a Ruminant Animal, and the mode of their action.

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94. STATE the relation between blue and white Indigo, and describe some mode of preparing an indigo vat, and explain the chemistry of the process.

95. In what respects does chemical affinity differ from other physical forces? Shew by examples that other forces interfere with chemical action.

96. Draw a figure of a combination of a cube and dodecahedron in the cubic system and the figure of a combination of the rhombohedrons 100, 011, $\bar{1}11$.

97. The analysis of 100 parts of a mineral yielded Chlorine 2·41, Arsenic acid 18·47, Phosphoric acid 3·34, Oxide of lead 76·47, Lime 0·50. Construct a formula for the mineral; the equivalents of Phosphorus, Arsenic, Chlorine, and Lead being in the ratios 31 : 75 : 35·5 : 103·5.

98. State the generic names of the fossils *A*, *B*, *C*.... ; and the formations to which they belong.

99. Explain the atmospheric actions in disintegrating and removing the surface of the earth.

100. How has the formation of Laticiferous Vessels been accounted for? and what is the nature of the fluids contained in them?

101. Explain the formation and destination of Cambium in the stems of woody Exogens.

102. Examine the skins of birds marked *A*, *B*, *C*,...., and refer them to their respective Orders and Families.

103. Describe the process of formation of the Shells of Molluscs. Explain the terms right-handed and left-handed as applied to univalve shells.

104. The power of reproducing parts that have been lost or destroyed varies much in different classes of organised beings, and at different stages of the existence of the same being. Cite facts in evidence, and generalise them.

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105. WHAT is the mode of preparing *gun-cotton?* and what the nature of that compound?

106. State and explain how common phosphate of soda is prepared from bone-earth.

107. Give the chemical formula expressing the constitution of rock-salt. In what directions does it cleave? What are its properties as regards the transmission of radiant heat? Describe an experiment illustrative of these properties. Enumerate the substances that can be considered isomorphous with it.

108. Mention the crystals in which it has been shewn that a change of temperature alters the angle between certain faces, and give an account of the observations by which this change of angle is established.

109. Explain the mode of aggregation of the ingredients in mineral veins, and state the theories which have been proposed to account for it; and give an account of any experiments which appear to support them.

110. Describe the phenomena which accompany earthquakes, and give a brief account of the chief theories to account for them.

111. Mention the requisites essential to the germination of seeds; and describe the chemical changes that take place during their germination.

112. Contrast woody-fibre with cotton-wool.

113. Examine the Skull marked *A*. To what animal, or order of animals does it belong?

114. Give a general account of the aquiferous or water-vascular system existing in some of the lower animals, and a more particular description of its type in some one limited group.

115. Are Nutrition and Secretion in animals essentially dependent on nervous agency? Give reasons for your opinion.

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116. Explain the method of means in Induction; and illustrate by its application to some one of the laws of Natural Science.

117. Define an element in Chemistry and when two bodies may be deemed identical in substance. Point out the axioms or assumptions involved in your definition.

118. Give an historical sketch of the theories of combustion.

119. State Sir John Herschel's views on the subject of selecting names for minerals; and those of Dr. Whewell on the terminology of Mohs, and the language in which the forms of crystals can best be described.

120. What was the method of investigation in Geology insisted on by William Smith? Trace the effects of his views on the progress of Geology from his time.

121. Give sketches of the Botanical Systems of Ray and De Candolle.

122. Give general outlines of the Classification of animals by Aristotle, Linnæus, and Cuvier in his latter works.

123. Explain the terms *Conditions of Existence* (Cuvier) and *Subordination of Characters*. Illustrate with examples.

124. Every component part of a complex organised body has an individual life and limited duration of its own, in a great degree irrespective of the condition of the entire body. Illustrate this general fact with particular examples, and give examples of the influence of external agencies upon the length of life of the constituent parts.

EXAMINED AND APPROVED.

FIRST CLASS.		SECOND CLASS.		THIRD CLASS.	
Bradford	Cath.	Barnard	Emman.	Townsend	Trin.

PREVIOUS EXAMINATION, Lent Term, 1861.

EXAMINERS:

John Riog, B.D. *St. John's College.*
Thomas Hughes Earle, M.A. *King's College.*
James Porter, M.A. *St. Peter's College.*
Arthur Ayres Ellis, M.A. *Trinity College.*
Arthur Beard, M.A. *St John's College.*
John Martineau Fletcher, M.A. *Caius College.*
John Robert Seeley, M.A. *Christ's College.*

CANDIDATES.

Adcock	Humph.	Alston	Clare	Austen-Leigh	King's
Ainslie	Pemb.	Alvis	Christ's	Austin	Sidney
Alder	Trin. H.	Anderson	Trin.	Babington	Clare
Alderson	Joh.	Andrews	Joh.	Bacon, J. G.	Clare
Aldis	Trin.	Arden, A. H.	Christ's	Bacon, W.	Clare
Alexander, A. B.	Christ's	Ash	Joh.	Baker, R.	Corpus
Alexander	Trin.	Aspland, J. L.	Sidney	Barker	Corpus
Allison	Sidney	Aspland, R.	Sidney	Barnes	Joh.
Allison	Trin.	Austen	Joh.	Baron	Joh.

Bathurst	Trin.
Bayne	Trin.
Beadon	Joh.
Beedham	Clare
Bell	Caius
Bertlin	Trin. H.
Besant	Emm.
Bettison	Corpus
Bigwood	Joh.
Birch	Caius
Birtwell	Queens'
Blaauw	Trin. H.
Blumberg	Trin. H.
Body	Joh.
Bolton	Trin.
Bourke	Trin.
Bowes-Watson	Trin.
Boyd	Christ's
Boyton	Magd.
Bradney	Trin.
Brady	Trin.
Branson	Caius
Broad	Caius
Bros	Joh.
Brown	Trin.
Brown, E. A.	Caius
Brown	Joh.
Brown	Trin. H.
Brown, J. W. D.	Caius
Browne	Trin.
Browne	Caius
Brownjohn	Clare
Buchanan	Trin.
Buckell	Joh.
Bulwer	Pemb.
Burnett	Queens'
Burrows	Cath.
Buxton	Trin.
Cadman	Christ's
Campion	Caius
Carey	Joh.
Carpenter	Corpus
Carrington	Joh.
Carroll	Trin.
Carter	Christ's
Carter	Trin.
Cartwright	Joh.
Casson	Christ's
Chalk	Pet.
Chancellor	Clare
Charles	Christ's
Child	Emm.
Churchill	Trin.
Clark	Caius
Clarke	Christ's
Clarke	Caius
Clarke	Pemb.
Cliff	Joh.
Clowes	Trin.
Collins	Christ's
Connor	Cath.
Cooke, C. E. B.	Trin.
Cooke, J. M.	Trin.
Cookson	Jesus
Cope	Trin.
Cornford	Trin.
Cotterill	Joh.
Crampton	Trin.
Crewdson	Trin.
Crosthwaite	Caius
Cruwys	Emm.
Currey	Trin.
Curtis	Joh.
Dalrymple	Trin.
Dalton	Clare
Darby	Trin.
Davies	Joh.
Davies, J. H.	Trin.
Davies	Cath.
Deane	Trin.
De Montmorency	Trin.
Dent	Trin.
De Putron	Caius
Dewe	Cath.
De Wend	Joh.
Deverell	Trin.
Dickinson	Joh.
Dickinson	Trin.
Dixon	Christ's
Dixon	Caius
Douet	Corpus
Dunlop	Trin.
Dunn	Corpus
Dyne	King's
East	Trin.
Edwards, J.	Trin.
Edwards, T.	Trin.
Edwards	Pet.
Edwards, N. W.	Trin.
Elderton	Corpus
Ellames	Trin.
Evans	Trin.
Everett	Trin.
Evett	Pemb.
Fairclough	Christ's
Falkner	Joh.
Featherstonhaugh	Trin.
Fellows	Magd.
Fison	Caius
Fontaine	Joh.
Forbes	Trin.
Foster	Pet.
Foye	Jesus
Francillon	Trin. H.
Frere	Trin.
Gael	Trin.
Gardner	Trin. H.
Garfit	Trin.
Garrett, T. (sen.)	Caius
Garrett T. (jun.)	Caius
Gaskell, C. M.	Trin.
Gaskell, T. K.	Trin.
Geach	Trin.
Gibbs	Trin. H.
Glennie	Trin.
Goodacre	Pemb.
Goold	Trin.
Graham	Jesus
Graves	Trin.
Green	Caius
Green	Trin.
Greene	Christ's
Grimley	Trin.
Guest, A. E.	Trin.
Guest, A. F.	Trin.
Guinness, F.	Joh.
Guinness, R.	Joh.
Gurdon	Trin.
Gurnhill	Emm.
Haigh	Christ's
Hale	Sidney
Hambro	Trin.
Hamilton, C.	Trin.
Hamilton, J.	Trin.
Hamilton	Pet.
Hampton	Queens'
Hanbury	Clare
Hankey	Trin.
Hanson	Trin.
Hardcastle	Trin.
Hargrove	Emm.
Harris	Emm.
Hawkins	Trin.
Hawthorn	Trin.
Heathcote	Trin.
Hensley	Trin.
Hewitt	Corpus
Hickman	Joh.
Hilleary	Joh.
Hoare	Trin.
Hockin	Joh.
Hodgets	Emm.

Hodgson	Corpus	Lock	Trin.	Pixell	Trin.
Hollis	Trin.	Long	Trin.	Plowden	Trin.
Hollond	Trin.	Lorimer	Joh.	Plumtre	Sid.
Honeysett	Joh.	Lowther	Trin.	Pooley	Joh.
Hope-Grant	Trin.	Luckock	Corpus	Prance	Trin.
Hopkins	Sidney	Lumley	Trin.	Pratt	Trin.
Hopkinson	Clare	Lush	Trin.	Pretor	Trin.
Horsfall	Christ's	Lyon	Trin.	Price	Joh.
Houldsworth	Trin.	Mackenzie	Trin.	Pritchard	Joh.
Hughes	Jesus	Madan	Trin.	Procter	Christ's
Hulbert	Caius	Maddy	Joh.	Purton	Trin.
Hulbert	Cath.	Marsh	Trin.	Quarrington	Cath.
Hunt	Caius.	Marshall	Trin. H.	Ranken	Caius
Huxtable	Christ's	Martin	Trin.	Ransford	Clare
Isaacson	Clare	Marton	Trin.	Ratcliffe	Trin.
Jeffery	Trin. H.	Mason	Cath.	Rees	Joh.
Jenner	Trin. H.	Mason	Pemb.	Reynolds	Caius
Jenkins	Jesus	Maurice	Caius	Richards	Sid.
Johnson	Trin.	Mayo	Trin.	Ridsdale	Caius
Johnson	Joh.	McGill	Christ's	Roberts	Queens'
Jones	Trin.	McNeile	Trin.	Roberts	Trin.
Jones, W. T.	Queens'	McVicar	Trin.	Rogers	Caius
Jones	Joh.	McWilliam	Caius	Rolph	Trin. H.
Jones	Queens'	Mellor	Trin. H.	Romer	Trin. H.
Karney	Trin.	Metcalfe	Joh.	Roose	Jesus
Kennedy	Trin. H.	Miller	Pemb.	Rose	Emm.
Kent	Trin.	Mirehouse	Clare	Rose	Queens'
Kinleside	Emm.	Mitton	Cath.	Rothschild	Trin.
Kinsey	Emm.	Monckton	Trin.	Rounthwaithe	Joh.
Knight	Caius	Monk	Jesus	Roworth	Emm.
Lang	Trin.	Moore	Pet.	Rudd	Joh.
Lane	Joh.	Moorsom	Trin.	Rust	Pemb.
Larbalestier	Joh.	Murray	Trin.	Rycroft	Trin. H.
Latham	Trin.	Myers	Queens'	Sale	Emm.
Laundon	Caius	Neil	Trin. H.	Salter	Clare
Laurie	Caius	Neville	Clare	Salusbury	Emm.
Lawson	Trin.	Nicholls	Joh.	Sanderson	Corpus
Leatham	Trin.	Nixon	King's	Sankey	Trin.
Leather	Joh.	Nottidge	Emm.	Savory	Trin.
Leavens	Queens'	Oakley	Trin.	Scholfield	Trin.
Ledger	Corpus	Ormrod	Emm.	Sculthorpe	Pet.
Lee	Caius	Outram	Christ's	Sedgwick	Caius
Lee	Trin.	Page	Christ's	Sevier	Trin.
Lee	Joh.	Pardoe, J.	Trin.	Shaw	Trin.
Lee	Magd.	Pardoe, W.	Trin.	Shepherd	Trin.
Leeke	Trin.	Parsons	Clare	Shickle	Humph.
Leeson	Down.	Partington	Trin.	Sidgwick	Trin.
Legge	Pet.	Patch	Clare	Sillitoe	Pemb.
Le Sueur	Pemb.	Peareth	Cath.	Simpson	Pet.
Lewis	Corpus	Peel	Christ's	Simpson	Trin.
Lewis	Emm.	Pennington	Pet.	Simpson	Pemb.
Lewthwaite	Trin.	Pierce	Corpus	Skinner	Clare
Lloyd	Trin.	Piffard	Jesus	Slater	Queens'
Lobley	Trin.	Pinches	Joh.	Smith	Trin.

Smith	Corpus	Tate	Queens'	Walker	Trin.
Smith	Caius	Tatham	Trin.	Wallis, J. H.	Joh.
Smith, E. A.	Christ's	Tatershall	Queens'	Wallis, W. M.	Joh.
Smith-Marriott	Trin.	Taylor	Cath.	Ward	Joh.
Smyly	Trin.	Taylor	Trin.	Ward	Trin.
Snowdon	Joh.	Taylor	Queens'	Ward	Queens'
Spencer	Jesus	Tebbs	Trin. H.	Warner	Trin. H.
Spencer	Emm.	Teevan	Trin. H.	Washington	Trin.
Spurling	Trin.	Thomas	Trin.	Wason	Caius
Stable	Pet.	Thompson	Joh.	Wayne	Trin.
Stanning	Trin.	Thompson	Trin.	Webb	Caius
Steele	Joh.	Thompson	Caius	Webster	Emm.
Stenning	Trin.	Thornley	Trin. H.	Wells	Emm.
Stephen	Christ's	Thornton	Trin.	Went	Christ's
Stephenson	Joh.	Thynne	Trin.	Wheatcroft	Caius
Sterling	Trin.	Tomlinson	Clare	Wheeler	Trin. H.
Stevens	Joh.	Towers	Pemb.	White	Sid.
Stevens	Magd.	Townend	Trin.	Whitehead	Joh.
Steward	Trin.	Treffrey	Magd.	Wilkins	Joh.
Straton	Trin.	Tuck	Emm.	Wilks	Trin.
Strutt, Hon. H.	Trin.	Turner	Caius	Willan	Joh.
Sturge	Trin.	Turner	Sid.	Williams	Emm.
Sturges	Trin.	Tweddle	Clare	Wilson	King's
Swann	Caius	Usborne	Trin.	Withers	Corpus
Swann	Trin.	Vaizey	Trin.	Wood	Trin.
Swinhoe	Christ's	Valentine	Joh.	Wright	Trin.
Talbot	Trin. H.	Waddell	Trin.	Wyon	Corpus
Tancock	Sid.	Walford	Trin.	Yearsley	Trin.
Tarleton	Joh.	Wallace	Trin.	Young	Caius
Tarratt	Trin.	Walker	Trin. H.		

EVIDENCES OF CHRISTIANITY.

1. State the proposition to which Paley confines himself in the former part of his work, and describe briefly the process by which he establishes it.

2. The case of miracles is called a contest of opposite improbabilities. How is it so? In stating this, what considerations does Mr. Hume omit, and what evade?

3. What position did Religion occupy among the nations of Greece and Rome? Shew that this must have been unfavourable to the spread of Christianity.

4. Quote passages from the Gospels which represent Our Lord Jesus Christ to have foretold the persecutions of his followers. How does Paley employ these passages to prove the reality of these sufferings?

5. What features of the narrative of the Acts of the Apostles are confirmed by the letters left behind by the Apostles?

6. What considerations make it highly probable that the story for which the early preachers of Christianity hazarded their lives was a miraculous one?

7. What four considerations are employed to shew that the story contained in the Scriptures of the New Testament is the story promulgated by the Apostles?

8. State the second Proposition established by the Author. On what ground does he lay out of the case the supernatural powers attributed to Pythagoras and Apollonius Tyaneus?

9. Shew that the general credibility of the Evangelical miracles is not

destroyed by the fact that some may be liable to the objections which the Author urges against heathen or post-Apostolic miracles.

10. Give instances of the candour of the Evangelists.

11. Shew the value of the history of the Resurrection.

12. Does Paley establish the necessity of being a Christian?

EVIDENCES OF CHRISTIANITY.

1. WHAT opinion with regard to the Deity does Paley assume to be held by those with whom he is arguing? Accepting the truth of such opinion, estimate the probability of a miraculous Revelation.

2. What does Paley mean by arguing from the nature of the case? Defend on this ground the sincerity of the first propagators of Christianity.

3. Sum up concisely the argument from the *nature of the case* by which Paley supports the truth of his first proposition.

4. Quote passages from the letters attributed to the early followers of Jesus Christ, which prove them to have been written by men labouring under persecution and suffering. Shew how unreasonable it is to imagine them to be forgeries.

5. Name the immediate followers of the Apostles from whose writings Paley extracts quotations. Give the substance of their testimony.

6. Sum up the historical evidence which compels us to believe that the early teachers of Christianity exerted great industry, and underwent great suffering.

7. How does Paley estimate the historical value (1) of the First and Fourth (2) of the Second and Third Gospels?

8. What does Paley mean by setting aside, in the proof of his second Proposition events depending on naked history? Shew that the Christian miracles do not come under this head.

9. Give examples from the Gospels of the benignity, the devoutness, and the lenity of our Saviour's character.

10. Mention any acts or remarks of Our Lord which exhibit strong internal evidence of reality and truthfulness.

11. What distinctions does Paley draw between the spread of Mahometanism and that of Christianity?

12. What portion of the Evidences do you consider to approach nearest to a demonstration, and what to fall farthest short of it?

EVIDENCES OF CHRISTIANITY.

1. SHEW clearly upon what grounds we may say that a miraculous history ought not to be rejected at first sight.

2. Give concisely Mr. Hume's objection to the reality of miracles. What does Paley consider its strongest point? Where in the book is that point discussed?

3. Quote the passage from Tacitus which bears direct testimony to the cruelties undergone by the early Christians at the hands of the Roman Government under Nero. What recent objection has been made to the value of this testimony?

4. Sketch briefly the account given by the writer of the book called "The Acts of the Apostles," of the progress of the Christian religion from the death of the Founder, down to the stoning of Stephen.

5. What heathen writer does Paley quote in evidence that the early propagators of Christianity submitted to new rules of conduct? Give his words as nearly as you can.

6. What circumstances of the life of our Lord are disclosed by the writings of the Apostles? What point of our argument do these allusions confirm?

7. For what object does Paley in the process of his argument employ the testimony of the Gospels? Shew how valuable they are for this purpose.

8. In appreciating the credit of a miraculous history what distinctions may be admitted besides those which relate to the evidence?

9. Shew how our Saviour laid stress on the regulation of the thoughts. What inference may be drawn from this?

10. What does Paley mean by the Identity of Christ's character, and to what points of identity does he call our attention?

11. Shew that the story of the Resurrection cannot be accounted for on the supposition of fraud or enthusiasm in those who first affirmed its truth.

12. Meet those objections to the reality of miracles which are drawn from the regularity of the Laws of Nature.

EVIDENCES OF CHRISTIANITY.

1. Can general experience be urged as an objection to the reality of miracles?

2. Setting aside historical evidence, what reception may we reasonably suppose the propagators of Christianity met with at the hands of the Jews?

3. What inference does Paley draw from the statements quoted by him from the writings of Tacitus, Suetonius, &c., bearing upon the persecutions of the Christians under Nero?

4. What remarks does Paley make upon the character of the narrative contained in the Acts of the Apostles?

5. What four observations does Paley make upon the history of the foundation of Christianity, as we read it in the writings of its earliest adherents?

6. Shew that it appears by the Gospels themselves that the story they relate was public at the time they were written.

7. Under what circumstances does Paley suppose the books of the New Testament Scriptures to have been composed?

8. What Christian miracles does Paley mention as being impossible to resolve into a false perception?

9. What does Paley mean by the negative character of our Lord's discourses, and what instances of it does he give?

10. Give a summary of the Chapter upon the originality of our Saviour's character.

11. Shew that a believer need not be discouraged by the absence of some effects of the Christian Religion which a sanguine temperament might from its character have been led to anticipate.

12. What is meant by the Rationalistic and Mythical modes of explaining away the miracles of our Lord and his Apostles? How do you account for Paley's not noticing them in detail?

ARITHMETIC.

1. Add 375 to 493 and explain the process.

2. Employ short division in dividing 663072 by 5760. Write down the remainder and compare the process by which 663072 grs. may be reduced to lbs., oz., and dwts. Troy.

3. Add $\frac{1}{7}$, $1\frac{1}{4}$, $\frac{2}{5}$ and divide the sum by $\frac{1}{2} + \frac{1}{3}(\frac{1}{2} - \frac{1}{7})$.

4. What fraction of 2 cwt. 14 lbs. is $\frac{1}{3}$ of 2 qrs. 14 lbs.?

Find the rent of 225 ac. 1 r. 19 p. at 13*s*. $2\frac{1}{2}$*d*. per rood.

5. Reduce £2. 17*s*. $4\frac{2}{9}$*d*. to the decimal of £7. Also add ·275 of a bushel to ·725 of a quarter, and find the value at 6*s*. 8*d*. per bushel.

6. Extract the square root of 17424 and of 175·250564.

The length of a rectangle is three times its breadth and its area is 5804 yds.; what is the length in feet?

7. If 12 Carlini be worth 4*s*. 1*d*. and a Napoleon be worth 16*s*.; how many Carlini ought to be received for 15 Napoleons?

8. If 5 men with 7 women earn £7. 13*s*. in 6 days, and 2 men with 3 women earn three guineas in the same time; in what time will 6 men with 12 women earn £60?

9. What is meant by interest and discount?

Find the interest on £474. 13*s*. 4*d*. at 4 per cent. per annum, for $3\frac{1}{2}$ years, simple interest.

10. A tradesman who is ready to allow 5 per cent. per annum, compound interest, for ready money, is asked to give credit for two years. If he charge £27. 11*s*. 3*d*. in his bill, what ought the ready money price to have been?

11. A person invests £2000. 16*s*. 1*d*. in the 3 per cents. at $90\frac{1}{2}$. What is the income derived by his investment?

A person invests in the 3 per cents. so as to obtain 3 per cent. clear on his investment when there is an income-tax of 7*d*. in the pound. What per centage clear does he obtain if the tax be doubled?

12. If the price of barley be 6*s*. 1*d*. per bushel and the cost of malting a quarter of barley be 2*s*. 2*d*. how much malt is made from 621 quarters of barley, supposing the malster to pay 24*s*. 2*d*. tax per quarter of malt and gain 5 per cent. on the whole of his outlay by selling malt at 77*s*. $1\frac{1}{2}$*d*. per quarter?

ARITHMETIC.

1. From 1861 take 1423 and explain the process.

2. Employ short division in dividing 195477 by 7920. Write down the remainder and compare the process by which 195477 inches may be reduced to furlongs, yards, feet, and inches.

3. Add $\frac{1}{5}$, $2\frac{1}{3}$, $\frac{1}{9}$ and $\frac{5}{21}$ and divide the sum by $\frac{1}{3} + \frac{1}{2}(\frac{1}{3} - \frac{1}{8})$.

4. Whst fraction of 2 sq. yds. 7 ft. is $\frac{1}{4}$ of 2 sq. yds. 5 ft.?

Find the value of 72 cwt. 3 qrs. 17 lbs. at £1. 4*s*. 6*d*. per cwt.?

5. Reduce £3. 15*s*. $9\frac{1}{2}$*d*. to the decimal of £9.

Also add 1·275 of a yard to 3·75 of a foot and find the value at 3*s*. 4*d*. per foot.

6. Extract the square root of 21025 and of 210·358669.

The length of a room is twice its breadth and the area is 1152 feet, what is its length?

7. If 10 scudi be worth 52·5 francs and 16 shillings are worth 20 francs; how much in English money will be equivalent to 45 scudi?

8. If 3 men with 4 boys earn £5. 16*s*. in 8 days, and 2 men with 3 boys earn £4 in the same time; in what time will 6 men and 7 boys earn 20 guineas?

9. State the meaning of Interest and Discount.

Find the sum which will produce £146. 11*s*. $1\frac{1}{2}$*d*. interest in $4\frac{1}{2}$ years at 3 per cent. per annum, simple interest.

10. A tradesman who is ready to allow 4 per cent. per annum, compound interest, for ready money, is asked to give credit for two years. If he charge £22. 10*s*. 8*d*. in his bill; what ought the ready money price to have been?

11. A person invests £1839. 18*s*. 3*d*. in the 3 per cents. at $91\frac{1}{2}$. What is his income derived from the investment?

A person invests in the 3 per cents. so as to receive 3 per cent. clear on his investment when there is an income-tax of 9*d*. in the pound. What per centage does he receive if the tax be increased to 1*s*. in the pound?

12. If the price of barley be 6*s*. per bushel and the cost of malting a

quarter of barley be 2*s.* 10*d.*: how much malt is made from 621 quarters of barley, provided the malster pays 25*s.* tax per quarter of malt and obtain 5 per cent. on the whole of his outlay by selling malt at 78*s.* per quarter?

ARITHMETIC.

1. WHAT number subtracted from three hundred and sixty-five millions twenty-seven thousand and forty-five will leave seventy-three thousand one hundred and five?

2. Define a vulgar fraction, and shew that a fraction is not altered in value if the numerator and denominator be multiplied by the same quantity.

Arrange in order of magnitude the fractions $\frac{7}{22}$, $\frac{106}{333}$ and $\frac{113}{355}$, and express the difference of the first two as a fraction of the difference of the last two.

3. State the rules for the conversion of a terminating and a circulating decimal into their equivalent vulgar fractions.

Express as vulgar fractions in their simplest forms

$$\cdot 0375,\ \cdot 3\dot{2}\dot{8} \text{ and } \cdot 23\dot{8} - \cdot 3\dot{2}\dot{8}.$$

4. Find the value of $\frac{2}{3}$ of $\frac{6}{17}$ of £1 14*s.* + $\frac{5}{8}$ of ·125 of £1 10*s.* + $8\frac{1}{4}$ of ·09 of 5*s.*, and express the result as a decimal fraction of £20.

5. A grocer buys a chest of tea containing 432 lbs. at 3*s.* $9\frac{3}{4}$*d.* per lb. He sells 360 lbs. at 4*s.* 4*d.* per lb., and the remainder, which is injured, at half the cost price per lb. Find his total gain.

6. Explain the statement of a question by the "Double Rule of Three."

If the penny loaf weigh 6 oz. when wheat is 5*s.* per bushel, what should be the weight of the shilling loaf when wheat is 7*s.* 6*d.* per bushel?

7. A pond whose area is 4 acres, is frozen over with ice to the uniform thickness of 6 inches; if a cubic foot of ice weigh 896 oz. avoirdupois, find the weight of ice on the pond in tons.

8. The wages of 12 men, 24 women, and 30 children amount in 6 days to £25 13*s.*

If the wages of a man, a woman, and a child be in the ratio 3 : 2 : 1, find the wages of each per day.

9. Find the interest of £2962 10*s.* from the 30th Dec. 1860, to the 13th March, 1861, at 4 per cent. per annum.

10. What is discount? and what is the present worth of a bill?

Find the present worth of a bill of £2750 due 5 months hence and discounted at $7\frac{1}{2}$ per cent. per annum.

11. If 9 per cent. be lost by selling a horse for £78 15*s.*, what will be gained or lost per cent. if he be sold for £90.

12. In the University boat race of 1860, the Cambridge crew rowed 39 strokes per minute, and the Oxford crew 41; but 19 strokes of the former were equal to 20 of the latter. The Cambridge crew rowed over the course in 25 minutes and the length of the course was 4 miles. Find the number of feet and the number of seconds by which the race was won.

13. What sum must a man invest in the 3 per cents. at $91\frac{1}{9}$, in order to have a clear income of £230, after paying an income-tax of 10*d.* in the pound?

ARITHMETIC.

1. WHAT number must be added to sixty-nine thousand, four hundred and twenty-seven, to produce three hundred and twenty-five millions, seven thousand and twenty-one?

2. Define a vulgar fraction, and prove that a fraction is not altered in value if the numerator and denominator be multiplied by the same quantity.

Arrange in order of magnitude the fractions $\frac{8}{33}$, $\frac{39}{161}$, $\frac{47}{194}$, and express the difference of the first two as a fraction of the difference of the last two.

3. State and prove the rule for the multiplication of decimal fractions. Multiply ·01385 by 61·37 and divide the result by 2·77.

4. Find the value of

$$\frac{3}{4} \text{ of } \frac{1}{9\frac{1}{2}} \text{ of } £1\ 18s. + \frac{2}{3} \text{ of } \cdot 375 \text{ of } 15s. + \frac{2}{5} \text{ of } \cdot 4\dot{2}\dot{9} \text{ of } 8s.\ 3d.$$

and express the result as a decimal fraction of £5.

5. The Examination for Mathematical Honours commences each year at 9 o'clock on the 1st Tuesday in January.

In 1861, the Examination commenced on January 1st. Find the number of seconds which will have elapsed from the commencement of the Examination in 1861 till its commencement in 1862.

6. A man purchases a bale of cloth containing 80 yards at £1 12*s.* per yard. He sells half of it at an advance of 25 per cent.; two-fifths of it at an advance of 4*s.* per yard, and the remainder which is injured at half the cost price; find his total gain, and his gain per cent.

7. Explain the mode of stating a question in the "Double Rule of Three."

If the penny-loaf weigh 6 oz. when wheat is at 5*s.* per bushel, what should be the price of a loaf weighing $4\frac{1}{2}$ lbs. when wheat is at 7*s.* 6*d.* per bushel?

8. A cubic foot of gold is extended by hammering, so as to cover an area of 6 acres. Find the thickness of the gold in decimals of an inch, correct to the first two significant figures.

9. Find the interest of £808 6*s.* 8*d.* from the 1st January 1861 to May 27th 1861, at $4\frac{1}{2}$ per cent. per annum.

10. What is discount? and what is the present worth of a bill?

Find the discount on a bill of £461 15*s.* $10\frac{1}{2}$*d.* due three months hence, and discounted at $7\frac{1}{2}$ per cent. per annum.

11. If 6 per cent. be gained by selling a horse for £79 10*s.*; how much is lost per cent. by selling him for £69?

12. In the University boat-race of 1860, the Cambridge crew rowed 39 strokes per minute, and the Oxford crew 41; but 19 strokes of the former were equal to 20 of the latter. The Cambridge crew rowed over the course in 25 minutes, and the length of the course was 4 miles. Find the number of feet and the number of seconds by which the race was won.

13. A man invests £8063 in the 3 per cents. at $91\frac{1}{2}$, the brokerage being $\frac{1}{8}$ per cent.; what will be his clear income, after an income-tax of 10*d.* in the pound is deducted?

EUCLID, I. II. III.

1. Define a *plane rectilineal angle*, and a *circle;* and enunciate the postulates.

2. The angles at the base of an isosceles triangle are equal to each other; and if the equal sides be produced, the angles on the other side of the base shall be equal.

3. Bisect a given finite straight line, that is, divide it into two equal parts.

4. Make a triangle of which the sides shall be equal to three given straight lines, but any two whatever of these must be greater than the third.

5. If a side of any triangle be produced, the exterior angle is equal to the two interior and opposite angles; and the three interior angles of every triangle are together equal to two right angles.

6. Triangles upon the same base, and between the same parallels, are equal to one another.

7. If the square described upon one of the sides of a triangle, be equal to the squares described upon the other two sides of it; the angle contained by these two sides is a right angle.

8. If a straight line be divided into any two parts, the rectangle contained by the whole and one of the parts, is equal to the rectangle contained by the two parts, together with the square of the aforesaid part.

9. Describe a square that shall be equal to a given rectilineal figure.

10. Define a *sector of a circle*, and *similar segments of circles*.

11. Find the center of a given circle.

12. If two circles cut one another, they shall not have the same center.

13. The opposite angles of any quadrilateral figure inscribed in a circle, are together equal to two right angles.

14. If two straight lines cut one another within a circle, the rectangle contained by the segments of one of them, is equal to the rectangle contained by the segments of the other.

EUCLID, I. II. III.

1. Define a *right angle*, and *parallel straight lines;* and distinguish between a postulate and axiom.

2. If two triangles have two sides of the one equal to two sides of the other, each to each; and have likewise the angles contained by those sides equal to each other; they shall likewise have their bases, or third sides, equal; and the two triangles shall be equal; and their other angles shall be equal, each to each, viz. those to which the equal sides are opposite.

3. Bisect a given rectilineal angle, that is, divide it into two equal angles.

4. If one side of a triangle be produced, the exterior angle is greater than either of the interior opposite angles.

5. Any two sides of a triangle are together greater than the third side.

6. Parallelograms upon equal bases, and between the same parallels, are equal to one another.

7. In any right-angled triangle, the square which is described upon the side subtending the right angle, is equal to the squares described upon the sides which contain the right angle.

8. If a straight line be divided into any two parts, the rectangles contained by the whole and each of the parts, are together equal to the square of the whole line.

9. Divide a given straight line into two parts, so that the rectangle contained by the whole and one of the parts, shall be equal to the square of the other part.

10. Define *a segment of a circle*, and *the angle in a segment*.

11. If a straight line drawn through the center of a circle bisect a straight line in it which does not pass through the center, it shall cut it at right angles: and conversely, if it cuts it at right angles, it shall bisect it.

12. If one circle touch another internally, they shall not have the same center.

13. The angles in the same segment of a circle are equal to one another.

14. If from any point without a circle two straight lines be drawn, one of which cuts the circle, and the other touches it; the rectangle contained by the whole line which cuts the circle, and the part of it without the circle, shall be equal to the square of the line which touches it.

EUCLID, I. II. III.

1. Define a plane angle, a sector of a circle, and a polygon. When are magnitudes assumed to be equal?

2. If two angles of a triangle be equal to one another, the sides also which subtend, or are opposite to, the equal angles, shall be equal to one another.

3. Draw a straight line perpendicular to a given straight line of an unlimited length, from a given point without it.

4. If from the ends of the side of a triangle, there be drawn two straight lines to a point within the triangle, these shall be less than the other two sides of the triangle, but shall contain a greater angle.

5. All the exterior angles of any rectilineal figure are together equal to four right angles.

6. The opposite sides and angles of parallelograms are equal to one another, and the diameter bisects them, that is, divides them into two equal parts.

7. If the square described upon one of the sides of a triangle be equal to the squares described upon the other two sides of it; the angle contained by these two sides is a right angle.

8. If a straight line be divided into any two parts, the rectangle contained by the whole and one of the parts is equal to the rectangle contained by the two parts together with the square of the aforesaid part.

9. Divide a given straight line into two parts, so that the rectangle contained by the whole, and one of the parts, shall be equal to the square of the other part.

10. If two circles touch each other externally, the straight line which joins their centers shall pass through the point of contact.

11. Draw a straight line from a given point, either without or in the circumference, which shall touch a given circle.

12. The opposite angles of any quadrilateral figure described in a circle, are together equal to two right angles.

13. Cut off a segment from a given circle, which shall contain an angle equal to a given rectilineal angle.

EUCLID, I. II. III.

1. What is an axiom? Define an acute-angled triangle, a gnomon, and similar segments of circles.

2. Shew how to draw from a given point a straight line equal to a given straight line.

3. If two triangles have two sides of the one equal to two sides of the other, each to each, and have likewise their bases equal; the angle which is contained by the two sides of the one shall be equal to the angle contained by the two sides equal to them, of the other.

4. The greater side of every triangle is opposite to the greater angle.

5. If two triangles have two sides of the one equal to two sides of the other, each to each, but the base of the one greater than the base of the other; the angle also contained by the sides of that which has the greater base, shall be greater than the angle contained by the sides equal to them of the other.

6. Parallelograms upon the same base, and between the same parallels, are equal to one another.

7. Describe a parallelogram that shall be equal to a given triangle, and have one of its angles equal to a given rectilineal angle.

8. If a straight line be divided into any two parts, the squares of the whole line, and of one of the parts, are equal to twice the rectangle contained by the whole and that part, together with the square of the other part.

9. In every triangle, the square of the side subtending any of the acute

angles, is less than the squares of the sides containing that angle, by twice the rectangle contained by either of these sides, and the straight line intercepted between the perpendicular let fall upon it from the opposite angle, and the acute angle.

Prove this when the perpendicular falls without the triangle.

10. If in a circle two straight lines cut one another which do not both pass through the center, they do not bisect each other.

11. The angles in the same segment of a circle are equal to one another.

12. In equal circles, equal circumferences are subtended by equal straight lines.

13. If a straight line touches a circle, and from the point of contact a straight line be drawn cutting the circle, the angles made by this line with the line touching the circle, shall be equal to the angles which are in the alternate segments of the circle.

MECHANICS.

1. WHAT is meant by Weight, and the moment of a force about a point? Forces can be properly represented by straight lines.

2. Define a Lever.

If two weights acting perpendicularly on a straight lever on opposite sides of the fulcrum balance each other, they are inversely as their distances from the fulcrum; and the pressure on the fulcrum is equal to their sum.

Two weights, 12 lbs. and 8 lbs. respectively at the ends of a horizontal lever 10 feet long balance. How far ought the fulcrum to be moved for the weights to balance when each is increased by 2 lbs.?

3. If two weights balance each other on a straight lever when it is horizontal, they will balance each other in every position of the lever.

4. Enunciate the parallelogram of forces, and, assuming the direction of the resultant, shew that the statement is true of the magnitude.

Two strings each making an angle of 30° with the vertical line support a weight. Compare the weight and tensions of the strings.

5. Graduate the Common Steel Yard.

What effect is produced on the graduation by increasing the specific gravity of the material of the yard?

6. In a system in which the same string passes round any number of pullies, and the parts of it between the pullies are parallel, there is an equilibrium when power (P) : weight (W) :: 1 : the number of strings at the lower block.

Prove that $P : W =$ W's displacement : P's displacement.

7. Describe the Wheel and Axle and compare P and W.

8. What is an inclined plane?

A weight of 12 lbs. rests on an inclined plane when a force of 6 lbs. parallel the plane acts on it. Find the pressure on the plane.

9. Define the center of gravity of a body.

If a body balance in any position about a fixed straight line in it, the center of gravity is in that line.

10. When a body is suspended from a point, it will rest with its center of gravity in the vertical line passing through the point of suspension.

A wire is bent into the form of a triangle and hangs from one angle with the base horizontal: shew that the triangle is isosceles.

11. A sphere rests between two inclined planes and the pressure on one which is given in position is double that on the other. Construct the position of the other plane and shew that the inclination of the given plane is less than the third of a right angle.

MECHANICS.

1. DEFINE Force. State how it is measured, and shew that forces can be properly represented by straight lines.

2. Define a Cylinder.

If two weights acting perpendicularly on a straight lever on opposite sides of the fulcrum balance each other, they are inversely as their distances from the fulcrum; and the pressure on the fulcrum is equal to their sum.

The length of a horizontal lever is 12 feet and the balancing weights at the end are 3 lbs. and 6 lbs. respectively. How far ought the fulcrum to be moved for equilibrium if each weight be placed 2 feet from the ends of the lever?

3. If two forces acting at any angles on the arms of any lever balance each other, they are inversely as the perpendiculars drawn from the fulcrum to the directions in which the forces act.

4. State the parallelogram of forces.

Three forces represented in magnitude and direction by the sides of a triangle can keep a point at rest.

Two strings at right angles to each other support a weight and one string makes an angle of 30° with the vertical line. Compare the tensions of the strings.

5. Graduate the Common Steel Yard.

What effect is produced on the graduation by increasing the moveable weight?

6. In a system in which each pulley hangs by a separate string, and the strings are parallel, there is an equilibrium when $P : W :: 1$: that power of 2 whose index is the number of moveable pullies.

If there be three pullies of equal weight (w) and P is equal to W, find W.

7. Describe the wheel and axle, and, assuming the relation of P and W, shew that $P : W =$ W's displacement : P's displacement.

8. Compare P and W on an inclined plane when P acts parallel to the plane.

Determine the pressure on the plane.

9. Define the center of gravity of a system of bodies.

Find the center of gravity of a triangle.

A triangle suspended from an angle has its base horizontal; shew that the triangle is isosceles.

10. When a body is placed on a horizontal plane, it will stand or fall, according as the vertical line, drawn from its center of gravity, falls within or without its base.

11. A sphere rests between two inclined planes and the pressure on one which is given in position is half that on the other plane. Construct the position of the other plane.

ALGEBRA.

1. PROVE that $a - (b - c) = a - b + c$ in the case when $b > c$ and $a > bc$.

Simplify the expression:

$$2a - (3b + 2c) - [5b + 6(b - c) + 5c - \{2a - (c + 2b)\}].$$

2. Define x^m, when m is a positive integer, and prove that $x^m \times x^n = x^{m+n}$, n being also a positive integer.

3. Multiply $a^2 + 4abx + 4b^2x^2$ by $a^2 - 4abx + 4b^2x^2$; and divide

$$b(x^3 + a^3) + ax(x^2 - a^2) + a^3(x + a) \text{ by } (a + b)(x + a).$$

4. Simplify the expressions:

$$\frac{5}{3(x-1)} - \frac{1}{6(x+2)} - \frac{3}{2x} - \frac{2x+3}{x(x-1)(x+2)},$$

and

$$\frac{\frac{a}{b} - \frac{b}{a}}{\frac{a}{b} + \frac{b}{a} + 2} + \frac{1 - \frac{b}{a} + \frac{b^2}{a^2}}{\frac{a}{b} + \frac{b^2}{a^2}}.$$

5. Add together the first and fourth, and also the second and third of the quantities

$$\frac{1}{x+3a}, \quad \frac{1}{x+a}, \quad \frac{1}{x-a}, \quad \frac{1}{x-3a},$$

and subtract the latter sum from the former.

For what positive values of x will the result be positive?

6. When are four quantities said to be proportional? Will the quantities 7, 22, 8, 25 satisfy your definition?

Determine x in order that $4 + x : 2x + 8 :: 2x - 1 : 3x + 2$.

7. If $a : b :: c : d$, prove that $a + b : a - b :: c + d : c - d$, and that

$$\frac{a}{b} = \frac{\sqrt[p]{(ma^p + nc^p)}}{\sqrt[p]{(mb^p + nd^p)}}.$$

8. Solve the equations:

(1) $\dfrac{x-1}{4} - \dfrac{1}{8}\left(\dfrac{x-5}{4} - \dfrac{14-2x}{5}\right) = \dfrac{x-9}{2} - \dfrac{7}{8}.$

(2) $\dfrac{2x-1}{x-1} - \dfrac{2x-3}{x-2} + \dfrac{1}{6} = 0.$

(3) $\left.\begin{aligned} x^2 - xy + y^2 &= 13, \\ x - y &= 1. \end{aligned}\right\}$

(4) $\left.\begin{aligned} x^2yz &= a, \\ xy^2z &= b, \\ xyz^2 &= c. \end{aligned}\right\}$

9. In the Astronomical clock, where the hours are marked upon the dial from 1 np to 24; find the time between 8 and 9 o'clock when the hands are together.

10. What is the price of eggs per dozen, when two less in a shilling's worth raises the price one penny per dozen?

11. An officer can form the men in his battalion into a solid square, and also into a hollow square 12 deep. If the front in the latter formation exceed the front in the former formation by 3, find the number of men in the battalion.

12. Two trains start at the same time from two towns, and each proceeds at a uniform rate towards the other town. When they meet, it is found that one train has run 108 miles more than the other, and that if they continue to run at the same rate, they will finish the journey in 9 and 16 hours respectively.

Find the distance between the towns, and the rates of the trains.

ALGEBRA.

1. Prove that $a - (b + c) = a - b - c$ in the case when $a > b + c$.

Simplify the expression

$$5a - 7(b - c) - [6a - (3b + 2c) + 4c - \{2a - (b + 2c - a)\}].$$

2. Define x^m when m is a positive integer and prove that $(x^m)^n = x^{mn}$, n being also a positive integer.

3. Multiply $a^2 - 2ab + b^2 + c^2$ by $a^2 + 2ab + b^2 - c^2$ and divide $b(x^3 - a^3) + ax(x^2 - a^2) + a^3(x - a)$ by $(a + b)(x - a)$.

4. Simplify the expressions:

$$\frac{1}{2(x-1)^2} - \frac{1}{4(x-1)} + \frac{1}{4(x+1)} - \frac{1}{(x-1)^2(x+1)},$$

and

$$\frac{\frac{a}{b} - \frac{b}{a}}{\frac{a}{b} + \frac{b}{a} - 2} - \frac{1 + \frac{b^2}{a} + \frac{b^2}{a^2}}{\frac{a}{b} - \frac{b^2}{a^2}}.$$

5. Add together the first and last of the three fractions

$$\frac{1}{x-a}, \quad \frac{1}{x}, \quad \frac{1}{x+a},$$

and subtract from the sum twice the second.

For what values of x will the result be positive?

6. When are four quantities said to be proportional?

Find two numbers in the ratio of 3 : 4, and such that if each be increased by 6, they shall be in the ratio of 4 : 5.

7. If $a : b :: c : d$; prove that $ad = bc$ and that

$$ma + nb : ma - nb :: mc + nd : mc - nd.$$

8. Solve the equations:

$$(1) \quad \frac{\frac{1}{2}x - 3}{5} + \frac{\frac{3}{4}x - 10}{2} - \left(\frac{3}{4} - \frac{14 - 2x}{8}\right) = \frac{10 - x}{6},$$

$$(2) \quad \frac{3x + 1}{3(x - 5)} - \frac{2x - 7}{2x - 8} - \frac{5}{2} = 0,$$

$$(3) \quad x^2 + \frac{b^2c^2}{4x^2} - \frac{b^2 + c^2 - a^2}{2} = \frac{(a + b - c)(a - b + c)}{2},$$

$$(4) \quad \begin{cases} \dfrac{36}{x^2 + 2xy + y^2} + \dfrac{18}{x + y} = 4, \\[2ex] \dfrac{12}{x^2 - 2xy + y^2} - \dfrac{2}{x - y} = 2. \end{cases}$$

9. In the Astronomical clock, where the hours are marked upon the dial from 1 up to 24; find the two times between 6 and 7 o'clock when the hands are at right angles.

10. What is the price of eggs per score, when 10 more in half a crown's worth, lowers the price 3*d*. per score?

11. An officer can form the men in his battalion into a hollow square 4 deep, and also into a hollow square 8 deep. If the front in the latter formation contain 16 men fewer than in the former formation; find the number of men in his battalion?

Shew that the battalion can be formed into 3 other hollow squares only.

12. Two pedestrians start at the same time from two towns, and each walks at a uniform rate towards the other town. When they meet, it is found that one has travelled 96 miles more than the other, and that if they proceed at the same rate, they will finish the journey in 4 and 9 days respectively. Find the distance between the towns, and the rates of walking per day.

EUCLID, IV. VI.

1. When is a circle said to be inscribed in a rectilineal figure?
Inscribe a circle in a given triangle.
2. Describe a square about a given circle.
3. A circle is inscribed in a triangle *ABC*, and a triangle is cut off at each angle by a tangent to the circle. The sides of the three triangles so cut off are together equal to the sides of *ABC*.
4. Inscribe a circle in a given equilateral and equiangular pentagon.
5. When are four magnitudes proportional?
If the sides of a triangle, or the sides produced, be cut proportionally, the straight line which joins the points of section shall be parallel to the remaining side of the triangle.
6. If two triangles have one angle of the one equal to one angle of the other, and the sides about the equal angles proportionals, the triangles shall be equiangular, and shall have those angles equal which are opposite to the homologous sides.
7. From a given straight line cut off any part required.
Divide a straight line into three equal parts.
8. Similar polygons may be divided into the same number of similar triangles.
9. The parallelograms about the diameter of any parallelogram, are similar to the whole, and to one another.
10. Describe a rectilineal figure which shall be similar to one and equal to another given rectilineal figure.

EUCLID, IV. VI.

1. When is a rectilineal figure inscribed in a circle?
In a given circle inscribe a triangle equiangular to a given triangle.
2. Inscribe a circle in a given square.
3. If a circle can be inscribed in a quadrilateral figure, the sums of the opposite sides are equal.
4. Inscribe an equilateral and equiangular pentagon in a given circle.
5. When are four magnitudes proportional?
If a straight line be drawn parallel to one of the sides of a triangle, it shall cut the other sides, or these produced, proportionally.
6. If the sides of two triangles, about each of their angles, be proportionals, the triangles shall be equiangular, and have their equal angles opposite to the homologous sides.
7. From a given straight line cut off any part required.
Divide a straight line into five equal parts.
8. Assuming that similar polygons may be divided into the same number of similar triangles; shew that the triangles have the same ratio to one another that the polygons have; and the polygons have to one another the duplicate ratio of that which their homologous sides have.
9. The parallelograms about the diameter of any parallelogram, are similar to the whole, and to one another.
10. In right-angled triangles, the rectilineal figure described upon the side opposite to the right angle, is equal to the similar and similarly described figures upon the sides containing the right angle.

SOPHOCLES. ŒD. TYR.

Translate: 408—425.
Beginning, *Εἰ καὶ τυραννεῖς, ἐξισωτέον τὸ γοῦν, κ.τ.λ.*
Ending, *ἃ σ' ἐξισώσει σοί τε καὶ τοῖς σοῖς τέκνοις.*

Explain the phrase *Κρέοντος προστάτου γεγράψομαι.* What is *ὅτων* put for? Give some account of any persons or places mentioned in this passage. Parse *γεγράψομαι, δέδορκας, λέληθας, εἰσέπλευσας, ἐξισωτέον, καταίσθῃ.* Explain this last line.

Translate: 1186—1191.

Beginning, *Ἰὼ γενεαὶ βροτῶν, κ.τ.λ.*

Ending, *καί δόξαντ' ἀποκλῖναι.*

SOPHOCLES. ŒD. TYR.

TRANSLATE: 390—403.

Beginning, *Ἐπεί, φέρ' εἰπέ, ποῦ σὺ μάντις εἶ σαφής; κ.τ.λ.*

Ending, *εἶναι, παθὼν ἔγνως ἂν οἷά περ φρονεῖς.*

αἴνιγμα. Explain the allusion.

μολών. What is the present indicative of this verb? Produce examples of a similar change of form.

Give the cognate tenses of *εἰδώς.* Parse *γνωτόν* and *ἔγνως.*

Translate: 863—871.

Beginning, *Εἴ μοι ξυνείη φέροντι, κ.τ.λ.*

Ending, *οὐδὲ γηράσκει.*

What is the derivation and exact meaning of *αἰθήρ*? Mention any forms in this passage which are not Attic.

TACITUS, HIST. I.

TRANSLATE: cap. 13.

1. Beginning, Potentia principatus divisa in T. Vinium, etc.
   Ending, prona in eum aula Neronis, ut similem.

Translate: caps. 69, 70.

2. Beginning, Haud facile dictu est, etc.
   Ending, sacramento Vitellii accessisse.

Parse *prætorii, aliquem, amoliretur, plerisque, dictu.*

Give the positive and superlative of *acrius,* and decline the positive.

Explain the meaning of *legio classica, primipilaris, vexillum, prætoriani, speculator, cohors, ala.*

TACITUS, HIST. I.

TRANSLATE: caps. 59, 60.

1. Beginning, Julius deinde Civilis periculo exemptus, etc.
   Ending, Cælius audendo potentior.

Translate: cap. 88.

2. Beginning, Primores senatus ætate invalidi, etc.
   Ending, et per incerta tutissimi.

Parse *adscivit, adjungerentur, sorde, inopes, perfugerit, oblita, alacres.*

Give the derivation of *momentum, occidi, aggregantibus.*

What is the modern name of *Lugdunum*? Where were the *Batavi* situated?

GREEK TESTAMENT. GOSPEL OF ST. LUKE.

I. TRANSLATE: chap. vii. 2—10.

Beginning, *Ἑκατοντάρχου δέ τινος δοῦλος, κ.τ.λ.*

Ending, *εὗρον τὸν ἀσθενοῦντα δοῦλον ὑγιαίνοντα.*

(1) Where was our Lord when this occurred?

(2) Mention any other occasions on which He commended the faith of those who sought His aid.

II. Translate: chap. xx. 20—25.
Beginning, Καὶ παρατηρήσαντες ἀπέστειλαν ἐγκαθέτους, κ.τ.λ.
Ending, καὶ τὰ τοῦ Θεοῦ τῷ Θεῷ.
(1) At what period of our Lord's ministry was this question addressed to Him?
(2) What Emperor was then reigning?
(3) What was the value of the coin shewn to our Lord?
(4) φόρου δοῦναι. What do these words mean?
(5) Are they the same in the parallel passage of S. Matthew?
III. Parse παρέξει, σκύλλου, ἐγκαθέτους, εἰκόνα, ἠξίωσα, ἰαθήσεται.

GREEK TESTAMENT. GOSPEL OF ST. LUKE.

I. Translate: chap. i. 1—7.
Beginning, Ἐγένετο δὲ ἐν ταῖς ἡμέραις ἐκείναις, κ.τ.λ.
Ending, διότι οὐκ ἦν αὐτοῖς τόπος ἐν τῷ καταλύματι.
(1) What is the exact meaning of ἀπογράφεσθαι?
(2) Κυρηνίου. Give the Latin name of this man in full.
(3) How do you solve the chronological difficulty which meets us in ver. 2?
II. Translate: chap. xii. 54—59.
Beginning, Ἔλεγε δὲ καὶ τοῖς ὄχλοις, κ.τ.λ.
Ending, ἕως οὗ καὶ τὸ ἔσχατον λεπτὸν ἀποδῷς.
(1) Where else in the New Testament does the word καύσων occur, and what is it taken to mean?
(2) Explain the use of the words δὸς ἐργασίαν.
III. Parse and derive ἡγεμονεύοντος, μεμνηστευμένῃ, ἐσπαργάνωσε, καταλύματι, δυσμῶν, πράκτορι.

TACITUS, HIST. I.

Translate: caps. 47, 48.
1. Beginning, Exacto per scelera die, etc.
Ending, ut prior occideretur.
Translate: cap. 76.
2. Beginning, Primus Othoni fiduciam addidit ex Illyrico nuntius, etc.
Ending, Carthaginem ceteræ civitates secutæ.
Parse *adnitentibus, hæsisse, quæsitis, cognitum est, formido, orto, obtulerat.*
What were the duties of the *prætor urbanus?*
Where were *Pannonia, Aquitania, provincia Narbonensis, Carthago?*

TACITUS, HIST. I.

Translate: cap. 2.
1. Beginning, Opus adgredior opimum casibus, etc.
Ending, per amicos oppressi.
Translate: cap. 31.
2. Beginning, Dilapsis speculatoribus, cetera cohors, etc.
Ending, Celsum ingestis pilis proturbant.
Parse *interempti, perdomita, seriem, porticu, commilitonum.*
Decline *insidiis.*
State the situation of all the places alluded to in the first of the above extracts.

SOPHOCLES. ŒD. TYR.

Translate: 958—972.
Beginning, ΑΓ. εἰ τοῦτο πρῶτον δεῖ μ' ἀπαγγεῖλαι σαφῶς, κ.τ.λ.
Ending, κεῖται παρ' Ἀιδῃ Πολυβος ἀξί οὐδενός.

Parse ἔφθιτο, θανών, ἴσθ', κτανών, βεβηκότα, ἔοικεν. Derive τλήμων.
Translate: 1384—1390.
Beginning, Τοιάνδ' ἐγὼ κηλῖδα μηνύσας ἐμὴν, κ.τ.λ.
Ending, τὴν φροντίδ' ἔξω τῶν κακῶν οἰκεῖν γλυκύ.
What is the nominative singular of ὧτων? Derive φραγμός. Explain the use of ἵνα in this passage. In what other senses is this word used? Why is μηδέν used here, and not οὐδέν?

SOPHOCLES. ŒD. TYR.

TRANSLATE: 771—793.
Beginning, Κοὐ μὴ στερηθῇς γ', ἐς τοσοῦτον ἐλπίδων, κ.τ.λ.
Ending, φονεὺς δ' ἐσοίμην τοῦ φυτεύσαντος πατρός.
Explain the construction of οὐ μὴ στερηθῇς.
Derive and explain ἄτιμος.
Explain the use of the optative future tense. Parse στερηθῇς, ὑπερπληαθείς, μεθέντι, προύφάνη, 'πακούσας, βεβῶτος, ἐπέστη, χρείη.

GREEK TESTAMENT. GOSPEL OF ST. LUKE.

I. TRANSLATE: chap. ix. 28—36.
Beginning, Ἐγένετο δὲ μετὰ τοὺς λόγους τούτους, κ.τ.λ.
Ending, καὶ οὐδενί ἀπήγγειλαν ἐν ἐκείναις ταῖς ἡμέραις οὐδὲν ὧν ἑωράκασιν.
(1) How do you explain τὸ ὄρος?
(2) What do you understand to be the full meaning of the words τὴν ἔξοδον αὐτοῦ ἣν ἔμελλε πληροῦν?
(3) On what other occasions were the same disciples alone with our Lord?
(4) What other Evangelists mention the Transfiguration?
(5) Is there any reference made to it in the Apostolic Epistles?
II. Translate: chap. xxiv. 50—54.
Beginning, Καὶ ἰδοὺ ἀνὴρ ὀνόματι Ἰωσήφ, κ.τ.λ.
Ending, καὶ σάββατον ἐπέφωσκε.
(1) What do you understand by βουλευτής?
(2) What does παρασκευή here mean?
III. Parse συγκατατεθειμένος, ἐνετύλιξεν, ἐπέφωσκε, Ἐπιστάτα.
Parse and derive λαξεύτῳ.

GREEK TESTAMENT. GOSPEL OF ST. LUKE.

I. TRANSLATE: chap. vi. 1—5.
Beginning, Ἐγένετο δὲ ἐν σαββάτῳ, κ.τ.λ.
Ending, Ὅτι κύριός ἐστιν ὁ υἱὸς τοῦ ἀνθρώπου καὶ τοῦ σαββάτου.
(1) What do you understand by σαββάτῳ δευτεροπρώτῳ?
(2) What was the action which the Pharisees deemed unlawful?
(3) What is the force of our Lord's rejoinder?
(4) Narrate the circumstances referred to in the Old Testament history.
II. Translate: chap. xi. 37—44.
Beginning, Ἐν δὲ τῷ λαλῆσαι, κ.τ.λ.
Ending, καὶ οἱ ἄνθρωποι οἱ περιπατοῦντες ἐπάνω οὐκ οἴδασιν.
(1) Explain the words πλὴν τὰ ἐνόντα δότε ἐλεημοσύνην.
(2) ἐστὲ ὡς τὰ μνημεῖα τὰ ἄδηλα. What do you understand by this?
Quote the words of a similar passage in St. Matthew's Gospel.
III. Parse ἀριστήσῃ, ἀφιέναι, τῶν σπορίμων.
Parse and derive ἀποδεκατοῦτε, πρωτοκαθεδρίαν, προθέσεως.

TACITUS, HIST. I.

TRANSLATE: cap. 7.

1. Beginning, Forte congruerat, ut Clodii Macri, etc.
   Ending, et Imperatores forma ac decore corporis (ut est mos vulgi) comparantibus.

Translate: caps. 61, 62.

2. Beginning, Adjuncto Britannico exercitu, etc.
   Ending, ubi facto magis, quam consulto, opus esset.

Parse *nequiverint, scrutaretur, quoquo, tutius, consulto.*

What are the modern names of the Cottian and Pennine Alps?

What are the degrees of comparison of *propior*?

TACITUS, HIST. I.

TRANSLATE: caps. 45, 46.

Beginning, Cædis et prædarum initium, etc.

Ending, In Martianum Icelum, ut in libertum, palam animadversum.

Explain the meaning of *vigiles, manipulus, vacationes.*

Parse *substraxit, intimâ, pendebat, commeatus, elanguerat, extremum, confossus.*

SOPHOCLES. ŒD. TYR.

TRANSLATE: 14—30.

Beginning, Ἀλλ', ὦ κρατύνων Οἰδίπους χώρας ἐμῆς, κ.τ.λ.

Ending, Ἅιδης στεναγμοῖς καὶ γόοις πλουτίζεται.

Point out the δέ which answers to the μέν of the second line of this passage.

Explain (1) βωμοῖσι τοῖς σοῖς, (2) φῦλον ἐξεστεμμένον. Parse προσήμεθα and ἅπτεσθαι.

What cases may πρός take, and in what different meanings? Derive ἀγορά, βούνομος.

Translate: 911—917.

Beginning, Χώρας ἄνακτες, δόξα μοι παρεστάθη, κ.τ.λ.

Ending, ἀλλ' ἐστὶ τοῦ λέγοντος, εἰ φόβους λέγοι.

SOPHOCLES. ŒD. TYR.

TRANSLATE: 540—561.

Beginning, Ἄρ' οὐχὶ μῶρόν ἐστι τοὐγχείρημά σου, κ.τ.λ.

Ending, ΚΡ. μακροὶ παλαιοί τ' ἂν μετρηθεῖεν χρόνοι.

Derive δυσμενῆ, αὐθαδίαν, ἐγχείρημα, ἄφαντος, νομίζεις.

Parse ἔπειθες, ἀντάκουσον, χρείη, εἰρῆσθαι.

Explain the construction of οἶσθ' ὡς ποίησον.

ἐθ' αὐτός. Give the genitive case of αὐτός.

ὑφέξειν. What is the present infinitive of this verb? Explain the change of form, and give other examples of it.

GREEK TESTAMENT. GOSPEL OF ST. LUKE.

I. TRANSLATE: chap. iv. 24—30.

Beginning, Εἶπε δέ, Ἀμὴν λέγω ὑμῖν, κ.τ.λ.

Ending, αὐτὸς δὲ διελθὼν διὰ μέσου αὐτῶν ἐπορεύετο.

(1) Narrate what preceded this speech of our Lord.

(2) Explain the force of His argument.

(3) Give the Old Testament name for Σάρεπτα.

(4) Compare the miracles of Elijah with those of Elisha; and shew which more nearly resembled our Lord's.

II. Translate: chap. xvi. 13—17.
Beginning, Οὐδεὶς οἰκέτης δύναται δυσὶ κυρίοις δουλεύειν· κ.τ.λ.
Ending, ἢ τοῦ νόμου μίαν κεραίαν πεσεῖν.
(1) Where else in the Gospels does the warning of v. 13 occur; and with what further illustrations?
(2) Explain v. 16.
(3) Give the exact meaning of the word *μεραία*.
III. Parse *δεκτός, ἐφρύος, ᾠκοδόμητο.*
Parse and derive *Μαμωνᾷ, ἐξεμυκτήριζον, βδέλυγμα.*

GREEK TESTAMENT. GOSPEL OF ST. LUKE.

I. TRANSLATE: chap. i. 1—7.
Beginning, Ἐπειδήπερ πολλοὶ ἐπεχείρησαν ἀνατάξασθαι διήγησιν, κ.τ.λ.
Ending, καὶ ἀμφότεροι προβεβηκότες ἐν ταῖς ἡμέραις αὐτῶν ἦσαν.
(1) What do you infer from these words as to the nature of St. Luke's Gospel? What date do you assign to it, and why?
(2) Give the names and relationship of the several members of the family of Herod mentioned in the New Testament.
(3) ἐξ ἐφημερίας Ἀβιά. Explain this by reference to the Old Testament.
II. Translate: chap. xvii. 1—4.
Beginning, Εἶπε δὲ πρὸς τοὺς μαθητάς, κ.τ.λ.
Ending, λέγων, Μετανοῶ, ἀφήσεις αὐτῷ.
(1) Compare with this the parallel passage in St. Matthew. By what parable does our Lord there enforce His precept?
(2) Explain the words *μύλος ὀνικός.*
III. Parse and derive *πεπληροφορημένων, αὐτόπται, παρηκολουθηκότι, κατηχήθης, ἀνένδεκτον, σκάνδαλα.*

TACITUS, HIST. I.

TRANSLATE: cap. 29.
1. Beginning, Ignarus interim Galba, etc.
Ending, ut ne post Galbam quidem bello locus esset.
Translate: cap. 81.
Beginning, Erat Othoni celebre convivium, etc.
Ending, incertas latebras petivere.
Parse *raperetur, adscitus sum, expertus.*
Decline *vicem* and *celebre.*
What is the difference between *oblĭtus* and *oblītus?*
Give the names of the Twelve Cæsars in order.

TACITUS, HIST. I.

TRANSLATE: cap. 20.
1. Beginning, Proxima pecuniæ cura, etc.
Ending, tamquam per artem et formidinem singuli pellerentur, omnibus suspectis.
Translate: cap. 50.
2. Beginning, Trepidam urbem, ac simul atrocitatem recentis sceleris, etc.
Ending, in melius mutatus est.
Pharsaliam, Philippos, et Perusiam, ac Mutinam. Explain the allusions.
Parse *repeti, fœnus, descivisse, deterrimos.*
What is the difference between *mille sestertii, mille sestertia,* and *millies sestertium?*

SOPHOCLES. ŒD. TYR.

TRANSLATE: 9—21.
Beginning, OI. Ἀλλ', ὦ γεραιέ, φράζ', ἐπεὶ πρέπων ἔφυς, κ.τ.λ..
Ending, ναοῖς, ἐπ' Ἰσμηνοῦ τε μαντείᾳ σποδῷ.
Parse καθέστατε, προσήμεθα, πτέσθαι. Derive δυσάλγητος and ἀγοραῖσι.
ὡς θέλοντος ἄν, κ.τ.λ. Explain the use of ἄν.
Explain the use of μὴ οὐ. Explain φῦλον ἐξεστεμμένον.
ὁρᾶς μὲν ἡμᾶς. Point out the δέ which answers to this μέν.
Translate: 1132—1140.
Beginning, Κούδέν γε θαῦμα, δέσποτ'. ἀλλ' ἐγὼ σαφῶς, κ.τ.λ.
Ending, λέγω τι τούτων, ἢ οὐ λέγω πεπραγμένον.
Derive ἀρκτοῦρον and ἐκμήνους.

SOPHOCLES, ŒD. TYR.

TRANSLATE: 287—313.
Beginning, OI. Ἀλλ' οὐκ ἐν ἀργοῖς οὐδὲ τοῦτ' ἐπραξάμην, κ.τ.λ.
Ending, ῥῦσαι δὲ πᾶν μίασμα τοῦ τεθνηκότος.
Derive ἀργοῖς, χθονοστιβῆ. Derive and explain προστάτην.
Parse εἰπόντος, μενεῖ, πέμψασιν, ἐκπεμψαίμεθα, κτανόντας.
Explain the difference between οὐδὲ and οὔτε.

GREEK TESTAMENT. GOSPEL OF ST. LUKE.

I. TRANSLATE: chsp. vii. 11—17.
Beginning, Καὶ ἐγένετο ἐν τῇ ἑξῆς, κ.τ.λ.
Ending, καὶ ἐν πάσῃ τῇ περιχώρῳ.
(1) In what other instances did our Lord raise the dead? Note the distinctive features of the several miracles.
II. Translate: chaps. xxiii. 55, 56, and xxiv. 1—3.
Beginning, Κατακολουθήσασαι δὲ καὶ γυναῖκες, κ.τ.λ.
Ending, καὶ εἰσελθοῦσαι οὐχ εὗρον τὸ σῶμα τοῦ Κυρίου Ἰησοῦ.
(1) Do we know from any of the other Gospels who these women were?
(2) Narrate the circumstances of our Lord's burial. What prophecy of the old Testament do they fulfil?
III. Parse and derive ἐσπλαγχνίσθη ἐπεσκέψατο ἀποκεκυλισμένον.
Why is ὄρθρου βαθέος the genitive case?

GREEK TESTAMENT. GOSPEL OF ST. LUKE.

I. TRANSLATE: chap. viii. 4—9.
Beginning, Συνιόντος δὲ ὄχλου πολλοῦ, κ.τ.λ.
Ending, τίς εἴη ἡ παραβολὴ αὕτη.
(1) Give our Lord's interpretation of this parable.
(2) Did He interpret any other?
II. Translate: chap. xxiii. 44—49.
Beginning, Ἦν δὲ ὡσεὶ ὥρα ἕκτη, κ.τ.λ.
Ending, καὶ γυναῖκες αἱ συνακολουθησασαι αὐτῷ ἀπὸ τῆς Γαλιλαίας, ὁρῶσαι ταῦτα.
(1) How is it proved that this darkness could not be that of a solar eclipse?
(2) εἰς χεῖράς σου παραθήσομαι τὸ πνεῦμά μου. Whence are these words quoted?
(3) δίκαιος ἦν. Illustrate this use of the word from the Acts of the Apostles. Do the words of the centurion, as given in the other Gospels, exactly correspond?
III. Parse συνιόντος, φυέν, ἐξηράνθη, ἰκμάδα, ὦτα, ἐσχίσθη.
Derive ἑκατονταπλασίονα, καταπετασμα.

SOPHOCLES, ŒD. TYR.

TRANSLATE: 332—355.
Beginning, TE. Ἐγὼ οὔτ' ἐμαυτὸν οὔτε σ' ἀλγυνῶ. τί ταῦτ', κ.τ.λ.
Ending, τὸ ῥῆμα; καί ποῦ τοῦτο φεύξεσθαι δοκεῖς.
Parse πύθοιο ὀργάνειας, ἐξερεῖς, ἐμέμψω, παρήσω, ἴσθι, εἰργάσθαι, φεύξεσθαι. στέγω. What part of the verb is this, and why?
Explain the construction of ὅσον μὴ χερσὶ καίνων.

SOPHOCLES, ŒD. TYR.

TRANSLATE: 1435—1457.
Beginning, KP. καὶ τοῦ με χρείας ὧδε λίπαρεῖς τυχεῖν, κ.τ.λ.
Ending, θνήσκων ἐσώθην, μὴ 'πί τῳ δεινῷ κακῷ.
Parse ἔσταμεν, δραστέον, πεύσεσθ', ἀπωλλύτην, πέρσαι, ἐσώθην.
Derive προσήγορος and πατροφόντης.
Distinguish between ἄστυ and πόλις.
Where is Cithæron, and what is its relative situation to the city of Œdipus' real, and to that of his supposed, father?

TACITUS, HIST. I.

TRANSLATE: cap. 40.
1. Beginning, Agebatur huc illuc Galba, etc.
Ending, cujus ultor est quisquis successit.
Translate: cap. 79.
2. Beginning, Conversis ad civile bellum animis, etc.
Ending, donec pauci, qui prœlio superfuerant, paludibus abderentur.
Parse *præcipites, depulsuri, cæsis, repente, incti, abderentur.*
Give the perfect tense of the following verbs: *veto, sumo, adstruo, eligo, diligo, occido, occido.*
Where were Mœsia, Noricum, Mediolanum, provincia Bœtica, colonia Ostiensis?

TACITUS, HIST. I.

TRANSLATE: caps. 17, 18.
1. Beginning, Pisonem ferunt statim intuentibus, etc.
Ending, quo vir virum legeret, pronuntiat.
Translate: cap. 39.
2. Beginning, Jam exterritus Piso fremitu crebrescentis seditionis, etc.
Ending, qui primo alacres fidem atque animum ostentaverant.
Parse *intuentibus, iri, tonitrua, rettulerat, diffugia, alacres.*
Give the derivations of *honorificus, ambitus, comitia, pergo.*
"Adoptari a se Pisonem *more Divi Augusti.*" What adoptions are here alluded to?

GREEK TESTAMENT. GOSPEL OF ST. LUKE.

I. TRANSLATE: chap. vii. 31—35.
Beginning, Εἶπε δὲ ὁ Κύριος, κ.τ.λ.
Ending, Καὶ ἐδικαιώθη ἡ σοφία ἀπὸ τῶν τέκνων αὐτῆς πάντων.
(1) Explain accurately the allusion in v. 32. (2) Paraphrase v. 35.
II. Translate: chap. xii. 1—7.
Beginning, Ἐν οἷς ἐπισυναχθεισῶν τῶν μυριάδων τοῦ ὄχλου, κ.τ.λ.
Ending, πολλῶν στρουθίων διαφέρετε.
Distinguish between ᾅδης, γεέννα, ἄβυσσος.
III. Parse ἐπισυναχθεισῶν, ἐπιλελησμένον, τρίχες, ὠρχήσασθε.
Derive ζύμη, τελωνής.

GREEK TESTAMENT. GOSPEL OF ST. LUKE.

I. TRANSLATE: chap. xi. 1—4.

Beginning, Καὶ ἐγένετο ἐν τῷ εἶναι αὐτὸν ἐν τόπῳ τινὶ προσευχόμενον, κ.τ.λ.

Ending, ἀλλὰ ῥῦσαι ἡμᾶς ἀπὸ τοῦ πονηροῦ.

(1) Mention other passages in this Gospel where it is recorded that our Lord was praying.

(2) Note any variation between the words of the Lord's Prayer as given in this passage and in St. Matthew.

(3) Explain τὸν ἄρτον τὸν ἐπιούσιον.

(4) What appears to be the true meaning of τοῦ πονηροῦ?

II. Translate: chap. xiv. 15—24.

Beginning, Ἀκούσας δ' τις τῶν συνανακειμένων ταῦτα εἶπεν αὐτῷ, κ.τ.λ.

Ending, τῶν κεκλημένων γεύσεταί μου τοῦ δείπνου.

Compare this parable with the similar one in St. Matthew's Gospel.

III. Parse ἀπὸ μιᾶς, γεμισθῇ, παρῃτημένον, ἄφες, εἰσενέγκῃς.

Derive φραγμούς.

EXAMINED AND APPROVED.

FIRST CLASS.

Ainslie	Pemb.	Bowes-Watson	Trin.	Clarke	Caius
Alder	Trin. H.	Boyd	Christ's	Clarke	Pemb.
Alderson	Joh.	Boyton	Magd.	Cliff	Joh.
Aldis	Trin.	Brady	Trin.	Clowes	Trin.
Alexander, A. B.	Christ's	Branson	Caius	Collins	Christ's
Alexander	Trin.	Broad	Caius	Connor	Cath.
Allison	Sid.	Bros	Joh.	Cooke, C.E.B.	Trin.
Allison	Trin.	Brown	Trin.	Cooke, J. M.	Trin.
Alston	Clare	Brown, E. A.	Caius	Cookson	Jesus
Alvis	Christ's	Brown	Joh.	Cope	Trin.
Anderson	Trin.	Brown	Trin. H.	Cornford	Trin.
Andrews	Joh.	Brown, J. W. D.	Caius	Crampton	Trin.
Arden, A. H.	Christ's	Browne	Trin.	Crewdson	Trin.
Austen	Joh.	Browne	Caius	Crosthwaite	Caius
Austen-Leigh	King's	Brownjohn	Clare	Currey	Trin.
Austin	Sid.	Buchanan	Trin.	Curtis	Joh.
Bacon, J. G.	Clare	Buckell	Joh.	Dalton	Clare
Baker, R.	Corpus	Bulwer	Pemb.	Darby	Trin.
Barker	Corpus	Burrows	Cath.	Davies	Joh.
Barnes	Joh.	Buxton	Trin.	De Putron	Caius
Baron	Joh.	Cadman	Christ's	Dewé	Cath.
Bathurst	Trin.	Campion	Caius	De Wend	Joh.
Beadon	Joh.	Carey	Joh.	Deverell	Trin.
Beedham	Clare	Carrington	Joh.	Dickinson	Joh.
Bell	Caius	Carter	Christ's	Dickinson	Trin.
Bertlin	Trin. H.	Chalk	Pet.	Dixon	Christ's
Besant	Emm.	Chancellor	Clare	Dixon	Caius
Birch	Caius	Charles	Christ's	Douëť	Corpus
Birtwell	Queens'	Child	Emm.	Dunlop	Trin.
Body	Joh.	Clark	Caius	Dunn	Corpus
Bolton	Trin.	Clarke	Christ's	Dyne	King's

East	Trin.
Edwards, J.	Trin.
Edwards, T.	Trin.
Edwards	Pet.
Elderton	Corpus
Evans	Trin.
Everett	Trin.
Evett	Pemb.
Fairclough	Christ's
Falkner	Joh.
Fison	Caius
Fontaine	Joh.
Francillon	Trin. H.
Gael	Trin.
Garrett, T., sen.	Caius
Gaskell, C. M.	Trin.
Glennie	Trin.
Goodacre	Pemb.
Green	Caius
Green	Trin.
Greene	Christ's
Grimley	Trin.
Guinness, F.	Joh.
Gurdon	Trin.
Gurnhill	Emm.
Haigh	Christ's
Hale	Sid.
Hamilton, C.	Trin.
Hampton	Queens'
Hanbury	Clare
Hankey	Trin.
Hanson	Trin.
Hardcastle	Trin.
Hargrove	Emm.
Harris	Emm.
Hawkins	Trin.
Hawthorn	Trin.
Heathcote	Trin.
Hensley	Trin.
Hewitt	Corpus
Hickman	Joh.
Hilleary	Joh.
Hoare	Trin.
Hockin	Joh
Hollis	Trin.
Hollond	Trin.
Hopkins	Sid.
Horsfall	Christ's
Hulbert	Caius
Hulbert	Cath.
Hunt	Caius
Huxtable	Christ's
Isaacson	Clare
Jeffery	Trin. H.
Jenner	Trin. H.
Jenkins	Jesus
Johnson	Joh.
Jones	Trin.
Jones	Queens'
Karney	Trin.
Kennedy	Trin. H.
Kent	Trin.
Kinleside	Emm.
Kinsey	Emm.
Knight	Caius
Lang	Trin.
Larbalestier	Joh.
Laurie	Caius
Ledger	Corpus
Lee	Caius
Lee	Joh.
Leeke	Trin.
Leeson	Down.
Le Sueur	Pemb.
Lewis	Corpus
Lewis	Emm.
Lobley	Trin.
Lowther	Trin.
Luckock	Corpus
Lush	Trin.
Mackenize	Trin.
Mac Vicar	Trin.
Maddy	Joh.
Marsh	Trin.
Marton	Trin.
Mason	Cath.
Mason	Pemb.
Mc Gill	Christ's
Mc Neile	Trin.
Mc William	Caius
Metcalfe	Joh.
Moore	Pet.
Moorsom	Trin.
Murray	Trin.
Neil	Trin. H.
Nicholls	Joh.
Nixon	King's
Nottidge	Emm.
Oakley	Trin.
Partington	Trin.
Patch	Clare
Pennington	Pet.
Pierce	Corpus
Pinches	Joh.
Plumptre	Sid.
Pooley	Joh.
Prance	Trin.
Pratt	Trin.
Pretor	Trin.
Price	Joh.
Pritchard	Joh.
Purton	Trin.
Quarrington	Cath.
Ranken	Caius
Ransford	Clare
Ratcliffe	Trin.
Rees	Joh.
Reynolds	Caius
Ridsdale	Caius
Rogers	Caius
Rolph	Trin. H.
Romer	Trin. H.
Rose	Emm.
Rounthwaite	Joh.
Rudd	Joh.
Rust	Pemb.
Sale	Emm.
Salter	Clare
Salusbury	Emm.
Sanderson	Corpus
Scholfield	Trin.
Sculthorpe	Pet.
Sedgwick	Caius
Shaw	Trin.
Sidgwick	Trin.
Sillitoe	Pemb.
Simpson	Pet.
Simpson	Trin.
Simpson	Pemb.
Slater	Queens'
Smith	Trin.
Smith	Caius
Smith, E. A.	Christ's
Smyly	Trin.
Snowdon	Joh.
Spencer	Emm.
Spurling	Trin.
Stanning	Trin.
Stenning	Trin.
Stephen	Christ's
Stephenson	Joh.
Stevens	Joh.
Stevens	Magd.
Steward	Trin.
Straton	Trin.
Strutt, Hon. H.	Trin.
Sturge	Trin.
Sturges	Trin.
Swann	Caius
Swann	Trin.
Talbot	Trin. H.
Tancock	Sid.

Tarleton	Joh.	Turner	Caius	Webb	Caius
Tate	Queens'	Turner	Sid.	Wells	Emm.
Tattershall	Queens'	Usborne	Trin.	Wheatcroft	Caius
Taylor	Trin.	Vaizey	Trin.	White	Sid.
Tebba	Trin. H.	Valentine	Joh.	Whitehead	Joh.
Teevan	Trin. H.	Waddell	Trin.	Wilkins	Joh.
Thomas	Trin.	Walford	Trin.	Wilks	Trin.
Thompson	Joh.	Walker	Trin. H.	Willan	Joh.
Thompson	Caius	Walker	Trin.	Williams	Emm.
Thornley	Trin. H.	Warner	Trin. H.	Wilson	King's
Thynne	Trin.	Washington	Trin.	Wood	Trin.
Tomlinson	Clare	Wason	Caius	Wyon	Corpus
Towers	Pemb.	Wayne	Trin.	Young	Caius
Tuck	Emm.				

SECOND CLASS.

Ash	Joh.	Hamilton	Pet.	Outram	Christ's
Aspland, J. L.	Sid.	Hodgetts	Emm.	Peel	Christ's
Babington	Clare	Hodgson	Corpus	Pixell	Trin.
Bacon, W.	Clare	Hopkinson	Clare	Richards	Sid.
Bettison	Corpus	Jones, W. T.	Queens'	Rose	Queens'
Bigwood	Joh.	Jones	Joh.	Rothschild	Trin.
Burnett	Queens'	Laundon	Caius	Smith	Corpus
Cartwright	Joh.	Leavens	Queens'	Stable	Pet.
Casson	Christ's	Legge	Pet.	Swinhoe	Christ's
Cotterill	Joh.	Lloyd	Trin.	Tarratt	Trin.
Davies, J. H.	Trin.	Lorimer	Joh.	Thompson	Trin.
Deane	Trin.	Lyon	Trin.	Thornton	Trin.
De Montmorency	Trin.	Madan	Trin.	Townend	Trin.
Dent	Trin.	Mellor	Trin. H.	Tweddle	Clare
Frere	Trin.	Miller	Pemb.	Ward	Trin.
Garfit	Trin.	Mitton	Cath.	Wheeler	Trin. H.
Gravea	Trin.	Monckton	Trin.	Withers	Corpus
Guinness, R.	Joh.	Myers	Queens'		
Hamilton, J.	Trin.	Neville	Clare		

Examined in Additional Subjects and approved.

Aldis	Trin.	Bertlin	Trin. H.	Cadman	Christ's
Alexander, A.B.	Christ's	Besant	Emm.	Campion	Caius
Alexander	Trin.	Birch	Caius	Carey	Joh.
Allison	Sid.	Birtwell	Queens'	Carrington	Joh.
Allison	Trin.	Bolton	Trin.	Carter	Trin.
Alston	Clare	Boyd	Christ's	Cartwright	Joh.
Anderson	Trin.	Boyton	Magd.	Chancellor	Clare
Andrews	Joh.	Brady	Trin.	Child	Emm.
Austen	Joh.	Broad	Caius	Clarke	Christ's
Austen-Leigh	King's	Brown	Trin.	Clarke	Caius
Bacon, J. G.	Clare	Brown, E. A.	Caius	Clarke	Pemb.
Bacon, W.	Clare	Brown	Joh.	Clowes	Trin.
Baron	Joh.	Brown	Trin. H.	Collins	Christ's
Bathurst	Trin.	Brownjohn	Clare	Connor	Cath.
Bayne	Trin.	Buchanan	Trin.	Cookson	Jesus
Beadon	Joh.	Buckell	Joh.	Cotterill	Joh.
Beedham	Clare	Burrows	Cath.	Crampton	Trin.
Bell	Caius	Buxton	Trin.	Crewdson	Trin.

Crosthwaite	Caius	Isaacson	Clare	Richards	Sid.
Currey	Trin.	Jeffery	Trin. H.	Ridsdale	Caius
Dalrymple	Trin.	Jones	Trin.	Rogers	Caius
Dalton	Clare	Jones	Queens'	Rolph	Trin. H.
Darby	Trin.	Kennedy	Trin. H.	Romer	Trin. H.
Davies, J. H.	Trin.	Kent	Trin.	Rose	Emm.
Deane	Trin.	Kinsey	Emm.	Rothschild	Trin.
De Montmorency	Trin.	Knight	Caius	Rounthwaite	Joh.
Dent	Trin.	Lang	Trin.	Rudd	Joh.
Deverell	Trin.	Larbalestier	Joh.	Rust	Pemb.
Dixon	Christ's	Leavens	Queens'	Sale	Emm.
Dixon	Caius	Ledger	Corpus	Salter	Clare
Dunlop	Trin.	Lee	Caius	Sanderson	Corpus
Dunn	Corpus	Lee	Joh.	Scholfield	Trin.
Dyne	King's	Leeke	Trin.	Sedgwick	Caius
East	Trin.	Le Sueur	Pemb.	Shepherd	Trin.
Elderton	Corpus	Lewis	Emm.	Sidgwick	Trin.
Everett	Trin.	Lobley	Trin.	Simpson	Pemb.
Evett	Pemb.	Long	Trin.	Smith	Trin.
Fairclough	Christ's	Luckock	Corpus	Smith, E. A.	Christ's
Falkner	Joh.	Lumley	Trin.	Smyly	Trin.
Fison	Caius	Lush	Trin.	Snowdon	Joh.
Fontaine	Joh.	Mackenzie	Trin.	Spencer	Jesus
Francillon	Trin. H.	MacVicar	Trin.	Spencer	Emm.
Gael	Trin.	Marton	Trin.	Spurling	Trin.
Garfit	Trin.	Mason	Pemb.	Stanning	Trin.
Garrett, T., sen.	Caius	McGill	Christ's	Stephen	Christ's
Gaskell, T. K.	Trin.	McNeile	Trin.	Stevens	Joh.
Green	Trin.	McWilliam	Caius	Stevens	Magd.
Greene	Christ's	Mellor	Trin. H.	Straton	Trin.
Grimley	Trin.	Metcalfe	Joh.	Strutt, Hon. H.	Trin.
Guinness, F.	Joh.	Mirehouse	Clare	Sturge	Trin.
Guinness, R.	Joh.	Moore	Pet.	Sturges	Trin.
Gurdon	Trin.	Moorsom	Trin.	Swann	Caius
Gurnhill	Emm.	Murray	Trin.	Talbot	Trin. H.
Haigh	Christ's	Myers	Queens'	Tancock	Sid.
Hale	Sid.	Neil	Trin. H.	Tarratt	Trin.
Hamilton, C.	Trin.	Nixon	King's	Tattershall	Queens'
Hankey	Trin.	Nottidge	Emm.	Tebbs	Trin. H.
Hardcastle	Trin.	Oakley	Trin.	Teevan	Trin. H.
Hargrove	Emm.	Peel	Christ's	Thompson	Joh.
Harris	Emm.	Pennington	Pet.	Thompson	Caius
Hawkins	Trin.	Pierce	Corpus	Thornley	Trin. H.
Heathcote	Trin.	Plumptre	Sid.	Towers	Pemb.
Hensley	Trin.	Pooley	Joh.	Turner	Sid.
Hewitt	Corpus	Prance	Trin.	Usborne	Trin.
Hickman	Joh.	Pratt	Trin.	Vaizey	Trin.
Hoare	Trin.	Pretor	Trin.	Waddell	Trin.
Hockin	Joh.	Price	Joh.	Walford	Trin.
Hollis	Trin.	Quarrington	Cath.	Wallace	Trin.
Hollond	Trin.	Ranken	Caius	Walker	Trin. H.
Hopkins	Sid.	Ransford	Clare	Wallis, J. H.	Joh.
Hulbert	Caius	Ratcliffe	Trin.	Wallis, W. M.	Joh.
Hunt	Caius	Rees	Joh.	Warner	Trin. H.
Huxtable	Christ's	Reynolds	Caius	Washington	Trin.

Webb	Caius	Wilkins	Joh.	Wilson	King's
Wheeler	Trin. H.	Wilke	Trin.	Wood	Trin.
White	Sid.	Willan	Joh.	Wyon	Corpus
Whitehead	Joh.	Williams	Emm.	Young	Caius.

THEOLOGICAL EXAMINATION, EASTER TERM, 1861.

EXAMINERS:

WILLIAM SELWYN, B.D., *Margaret Professor of Divinity.*
THOMAS JARRETT, M.A., *Hebrew Professor.*
JOHN RIGG, B.D., *St. John's College.*
JOHN SMYTH PURTON, B.D., *St. Catherine's College.*
THOMAS THOMASON PEHOWNE, B.D., *Corpus Christi College.*
ARTHUR AYRES ELLIS, M.A., *Trinity College.*

CANDIDATES.

Abell	B.A.	Sid.	Dixon	B.A.	Joh.
Ambrose	B.A.	Corpus	Dover	B.A.	Jes.
Appleton	B.A.	Joh.	Edlin	B.A.	Trin.
Arden	B.A.	Christ's	Edwards	B.A.	Emman.
Armitage	B.A.	Emman.	Evans	B.A.	Corpus
Athawes	B.A.	Clare	Flather	B.A.	Joh.
Attwood	B.A.	Emman.	Flintoff	B.A.	Emman.
Baker	B.A.	Caius	Fowler	B.A.	Trin.
Baldock	B.A.	Trin.	Francis	B.A.	Joh.
Beales	B.A.	Joh.	Francis	B.A.	Emman.
Benson	B.A.	Magd.	Fullerton	B.A.	Emman.
Berry	B.A.	Pemb.	Geary	B.A.	Corpus
Bigg	B.A.	Caius	Gray	M.A.	Trin.
Blissard	B.A.	Emman.	Griffith	B.A.	Emman.
Blofeld	B.A.	Trin.	Grist	B.A.	Joh.
Bothamley	B.A.	Trin.	Gunter	B.A.	Joh.
Bower	B.A.	Trin.	Hardy	B.A.	Christ's
Boys	B.A.	King's	Harvey	B.A.	Christ's
Braithwaite	B.A.	Clare	Harvey	B.A.	Joh.
Brereton	B.A.	Joh.	Hodgson	B.A.	King's
Brown	B.A.	Caius	Holley	B.A.	Trin. H.
Brown	B.A.	Cath.	Holmes	B.A.	Emman.
Burney	B.A.	Trin.	Howell	B.A.	Cath.
Castley	B.A.	Pemb.	Hudson	M.A.	Trin.
Chichester	B.A.	Trin.	Hulbert	B.A.	Caius
Clark	B.A.	Joh.	Hunnybun	B.A.	Caius
Clark	B.A.	Magd.	Ingles	B.A.	Trin.
Clayton	B.A.	Emman.	Jenkin	B.A.	Joh.
Clint	M.A.	Trin.	Johnston	B.A.	Trin.
Coldham	M.A.	King's	Jones	B.A.	Cath.
Collison	B.A.	Pemb.	Jones	B.A.	Joh.
Cornish	B.A.	Sid.	Kelly	LL.B.	Trin. H.
Cottam	B.A.	Pemb.	Kemble	B.A.	Trin.
Curtois	B.A.	Sid.	Kershaw	B.A.	Joh.
Custance	B.A.	Joh.	Langshaw	B.A.	Trin.
Dawson	B.A.	Christ's	Leach	B.A.	Caius
Day	B.A.	Joh.	Lock	S.C.L.	Joh.
Dickson	B.A.	Trin.	Marsden	B.A.	Joh.

Marsden	B.A.	Emman.	Royds	B.A.	Christ's
Marshall	LL.B.	Pet.	Sainsbury	B.A.	Trin.
Massy	B.A.	Joh.	Salvin	B.A.	Christ's
Mathews	B.A.	Joh.	Sanders	B.A.	Joh.
May	B.A.	Christ's	Sandys	B.A.	Corpus
Meres	B.A.	Emman.	Scholefield	M.A.	Emman.
Monk	B.A.	Trin.	Shaw	B.A.	Trin.
Morse	B.A.	Trin.	Sheffield	B.A.	Trin. H.
Nelson	B.A.	Jes.	Sheild	B.A.	Clare
Newton	B.A.	Emman.	Shepherd	B.A.	Trin.
Nicholls	B.A.	Joh.	Sitwell	B.A.	Joh.
Nisbet	B.A.	Jes.	Skipworth	B.A.	Emman.
Nixon	B.A.	Corpus	Slater	LL.B.	Trin. H.
Noble	B.A.	Joh.	Sparrow	B.A.	Clare
Norgate	B.A.	Corpus	Stanwell	B.A.	Joh.
Northey	B.A.	Trin.	Starky	B.A.	Magd.
Parez	M.A.	Pemb.	Steward	B.A.	Trin.
Pearse	B.A.	Caius	Taylor	B.A.	Joh.
Pearson	B.A.	Cath.	Todd	B.A.	Trin.
Pemberton	B.A.	Cath.	Turnbull	B.A.	Trin.
Pettitt	B.A.	Trin.	Twiat	B.A.	Magd.
Pierpoint	B.A.	Joh.	Walbran	B.A.	Pemb.
Pinney	B.A.	Caius	Wale	B.A.	Magd.
Potts	M.A.	Joh.	Walsham	B.A.	Magd.
Pretyman	B.A.	Trin.	Warwick	B.A.	Magd.
Price	B.A.	Joh.	Watkins	B.A.	Caius
Quilter	B.A.	Pet.	Watson	LL.B.	Christ's
Rigby	B.A.	Trin.	Webb	B.A.	Joh.
Rogers	B.A.	Trin.	Williams	B.A.	Christ's
Rogers	M.A.	Clare	Winslow	B.A.	Caius
Royds	B.A.	Trin.	Wood	B.A.	Joh.

HISTORICAL BOOKS OF THE OLD TESTAMENT.

1. Give an account of Isaac, stating particularly
(1) the circumstances under which his name was first given,
(2) the promises made to him.

2. Narrate the history of Jacob from the time of his marriage with Rachel.

3. State the regulations under which the Levites were substituted for the first-born of the children of Israel.

What was the portion assigned to the Levites in the promised land, and wherein did their tenure of property differ from that of their brethren?

4. What injunctions were given to Moses concerning numbering the people?

5. Illustrate and make your remarks on
(1) Gen. xxxi. 7. "And your father hath deceived me and changed my wages ten times."
(2) Joshua xxi. 21. "For they gave them *Shechem with her suburbs* in Mount Ephraim to be a *city of refuge* for the slayer."

6. Write a short account of Gideon and his descendants.

What ceremonies and proclamations were enjoined by Moses relative to entering on war?

7. Give a history of Saul down to the time of his rejection.

What injunctions did Moses give for the King of the Israelites and by what Kings were any of them disregarded?

8. "The God that answereth by fire, let him be God."
Describe the condition of Israel when Elijah made this appeal.
Mention other instances when the acceptance of a sacrifice was indicated by the falling of fire from heaven.

9. Enumerate the leading events in the history and time of Hezekiah.

10. Describe the restoration of the Jews to Palestine, and the struggles attending the rebuilding of the City and Temple.

11. Mention the Geographical position of Gilgal, Bethel, Mount Ebal, Ashdod, Dan, and Hebron, with some single circumstance relative to each.

THE FOUR GOSPELS AND THE ACTS, THE FIRST EPISTLE TO THE CORINTHIANS, THE EPISTLE TO THE GALATIANS, THE EPISTLE OF ST. JAMES.

1. SHEW that St. Mark's Gospel, as compared with the other three, is calculated to supply a distinct want of the Church; and also that it is entitled to be regarded as an original and independent work.

2. What is to be gathered from the opening verses of the Acts of the Apostles as to (1) the proper subject of the Book, and (2) its relation to the Gospel history?

3. Translate with brief notes where you think them necessary:

(*a*) Beginning, *Καὶ καταβαινόντων αὐτῶν ἀπὸ τοῦ ὄρους, κ.τ.λ.*
Ending, *ὅτι περὶ Ἰωάννου τοῦ βαπτιστοῦ εἶπεν αὐταῖς.*
St. Matth. xvii. 9—13.

What event had immediately preceded these words? On what Old Testament authority did the scribes say that Elias must first come? How far is John the Baptist to be identified with Elias?

(*b*) Beginning, *Καὶ ἐὰν ὁ ὀφθαλμός σου σκανδαλίζῃ σε, κ.τ.λ.*
Ending, *καὶ εἰρηνεύετε ἐν ἀλλήλοις.*—St. Mark ix. 47—50.

Derive and explain *γέεννα*. What other word is rendered 'hell' in our English Version? What is the difference of meaning between the two?

(*c*) Beginning, *Νῦν ἡ ψυχή μου τετάρακται· κ.τ.λ.*
Ending, *πάντας ἑλκύσω πρὸς ἐμαυτόν.*—St. John xii. 27—32.

At what period of our Lord's life were these words spoken, and what request called them forth? Shew that the concluding sentence of the passage stands related to that request. Have we any earlier example of this mental struggle which has been called the *passio inchoata?*

(*d*) Beginning, *Ἀνοίξας δὲ Πέτρος τὸ στόμα εἶπεν· κ.τ.λ.*
Ending, *ὅτι ὁ Θεὸς ἦν μετ' αὐτοῦ.*—Acts x. 34—38.

Punctuate and translate this either according to the authorised version or in any other way that you prefer.

(*e*) Beginning, *Ἐπικουρίας οὖν τυχὼν τῆς παρὰ τοῦ Θεοῦ, κ.τ.λ.*
Ending, *καὶ τοῖς ἔθνεσι.*—Acts xxvi. 22, 23.

4. In which of his apostolical journeys did St. Paul first visit Corinth? Draw a rough map of the countries traversed by him in that journey, and mark upon it his route. How long was his first residence at Corinth? Mention the principal heresies and disorders to confute and correct which his first Epistle to that Church was written.

5. Translate:

(*a*) Beginning, *Εἰ δέ τις καλεῖ ὑμᾶς τῶν ἀπίστων, κ.τ.λ.*
Ending, *Μιμηταί μου γίνεσθε, καθὼς κἀγὼ Χριστοῦ.*
1 Cor. x. 27, xi. 1.

Explain where necessary the connection of the argument.

(*b*) Beginning, *Καθ' ἡμέραν ἀποθνήσκω, κ.τ.λ.*
Ending, *πρὸς ἐντροπὴν ὑμῖν λέγω.*—1 Cor. xv. 31—34.

To what do you refer κατὰ ἄνθρωπον ἐθηριομάχησα ἐν Ἐφέσῳ?

6. By whom and under what circumstances was Galatia first evangelised? What condition of the Churches there called forth St. Paul's Epistle to them? Shew that the different doctrinal tone of that Epistle and the Epistle of St. James is to be accounted for by the differing requirements of the persons to whom they were respectively addressed.

7. Translate with brief notes as before:

Beginning, Ἔπειτα διὰ δεκατεσσάρων ἐτῶν, κ.τ.λ.

Ending, ἐμοὶ γὰρ οἱ δοκοῦντες οὐδὲν προσανέθεντο.—Gal. ii. 1—6.

8. To which of the persons of that name mentioned in the New Testament do you ascribe the Epistle of St. James? Give the grounds of your decision, and in accordance with it state what is known of the writer.

9. Translate as before:

(*a*) Beginning, Γίνεσθε δὲ ποιηταὶ λόγου, κ.τ.λ.

Ending, οὗτος μακάριος ἐν τῇ ποιήσει αὐτοῦ ἔσται.—Jas. i. 22—25.

(*b*) Beginning, Ἰδοὺ τῶν ἵππων τοὺς χαλινοὺς εἰς τὰ στόματα βάλλομεν πρὸς τὸ πείθεσθαι αὐτοὺς ἡμῖν, κ.τ.λ.

Ending, καὶ φλογιζομένη ὑπὸ τῆς γεέννης.—Jas. iii. 3—6.

10. Retranslate into Greek, amending the English Version where you think it necessary:

Simon, Simon, Satan hath desired to have you that he might sift you as wheat: but I have prayed for thee that thy faith fail not.

When he speaketh a lie he speaketh of his own, for he is a liar and the father of it.

I am the good shepherd, and know my sheep, and am known of mine. As the Father knoweth me, even so know I the Father: and I lay down my life for the sheep.

Which is the chief city of that part of Macedonia, and a colony..And he was eaten of worms, and gave up the ghost..We took up our carriages.

But he himself shall be saved; yet so, as by fire.

Ye see how large a letter I have written unto you with mine own hand.

Do ye think that the Scripture saith in vain, the spirit that dwelleth in us lusteth to envy?

11. Establish the truth of the following statements, and shew what use may be made of them:

a. There is a difference in the quarter from which opposition to the Gospel of Christ proceeded, as represented in the Gospels and in the Acts, most characteristic of truth, though most unobtrusive in itself.

b. The Epistle to the Galatians and the Acts of the Apostles were written without any communication with each other; yet the Epistle by recital, implication, or reference, bears testimony to many of the facts contained in the history.

ARTICLES OF RELIGION.

1. To what circumstances do the 'Articles of Religion' owe their origin? Trace the various stages through which they passed before they assumed their present form. Is it fair to regard them as 'a solitary standard of doctrine'?

2. Compare the Articles of 1552 with the present Thirty-nine; and account for the differences which you notice.

3. What is the history of the Document known as 'the Lambeth Articles'? Was it ever authoritative?

4. Give proof from Holy Scripture, (1) That the HOLY GHOST is GOD; (2) That HE is a PERSON.

5. Into what three sections does Article II. naturally divide itself?

Quote the words of it which relate to the *Atonement*, and render a Scriptural proof of them.

6. In what *four words* does Hooker briefly comprise 'all that antiquity has handled as touching the person of JESUS CHRIST'? Specify the heresies to which he refers, and the Councils in which they were condemned.

7. What is the history of Article III? In what sense do you understand it? Upon what passage of Scripture is it based?

8. Investigate the meaning of the words *Canon*, and *Apocrypha*. Quote the words of Article VI. which relate to the *Canon of Scripture*. Establish the Canonicity of the books of the Old Testament.

9. (*a*) "In Vetere Testamento Novum latet, In Novo Testamento Vetus patet."—*St. Augustinus.*

Shew that this is substantially the doctrine of the Church of England in Article VII.

(*β*) "Quare male sentiunt qui veteres tantum in promissiones temporarias aperasse confingunt."

In what form has the error here condemned reappeared since the Reformation? Shew that it is unscriptural.

10. (*α*) Date the Nicene Creed, and mention the circumstances which led to the framing of it. When did it assume its present form?

(*β*) "I believe in the HOLY GHOST. THE LORD and Giver of Life."

Write down the original of this clause, and quote any passages of the Greek Testament from which these Titles may have been derived.

11. Investigate the Authorship of the Athanasian Creed, and write down the original of the following clauses:

(1) "The FATHER incomprehensible, the SON incomprehensible, and the HOLY GHOST incomprehensible.

(2) "Perfect GOD and Perfect MAN, of a reasonable soul and human flesh subsisting."

12. Write down the Latin words of Article IX. and (assuming them to be of co-ordinate authority) give reasons for preferring the Latin to the English form.

Briefly sketch the history of the Pelagian Heresy.

13. Examine the teaching of the Homily referred to in the Article '*Of the Justification of Man.*' Distinguish between '*fides informis*' and '*fides formata.*'

Shew that the doctrine of this Article is in harmony with the teaching of St. Paul and St. James.

14. Illustrate from the History of the Church the position, that 'General Councils have erred even in things pertaining unto GOD.' In what sense must you construe the word 'General'?

15. How does it appear that Transubstantiation 'overthroweth the nature of a Sacrament'? Distinguish the Romanist from the Lutheran doctrine of this Sacrament. Examine the meaning of the word 'Sacrament.' How does our Church distinguish between 'the two Sacraments of the Gospel' and 'those five commonly called Sacraments'? Enumerate these last.

THE LITURGY.

1. ARRANGE the contents of the Prayer-book according to the fourfold division given in its title. Give the names of the corresponding Latin Service-books, and trace, if you can, the origin of those names. Explain the term 'Use.' What are the 'Sealed Books'?

2. (*a*) "In *laudibus An.* In illa die stillabunt montes dulcedinem ..*Ps.* Dominus regnavit..*Capitulum.* Hora est jam nos de somno surgere ..*Hymnus.* Vox clara ecce intonat. *Vers.* Vox clamantis in deserto. *Res.*

Parate viam Domini... *Oratio*. Excita quæsumus Domine. *Memoria de sancta Maria*. Missus est Gabriel angelus."..

(*b*) "Deinde dicitur *offertorium*."

(*c*) "Deinde accipiat sacerdos infantem *per latera* in manibus suis, et interrogato nomine ejus, baptizet eum *sub trina immersione*."

Explain the terms printed in italics in the above rubrics.

Describe the chief characteristics of a Missal at the beginning of the reign of Henry VIII.

3. Compare the Order for Daily Morning Prayer as settled at the last revision with the same Order as it stood in 1549.

4. The Presbyterians in 1661 objected to the following phrases in the Prayer-book:—'deadly sin'; 'sudden death'; 'all that travel'; 'with my body I thee worship'; 'till death us do part.' Shew that their objections were ill-founded.

5. Trace the principal changes in the Office for Confirmation from 1549 to 1662. State clearly the origin and meaning of the rite of Confirmation, and support your answer by quotations from the present office.

6. The Prayer of Consecration in the Office for the Holy Communion consists of three parts. What are they?

7. Give an outline of the two Offices for the Ordering of Deacons and of Priests, and state the main points of difference between them.

8. Give the history of the following rubrics:

(*a*) "At Morning Prayer, instead of the Psalm 'O come, let us sing &c.,' these Anthems shall be sung or said."

(*b*) "To take away all occasion of dissension and superstition..it shall suffice that the Bread be such as is usual to be eaten."

(*c*) First, let the Minister of the Parish (or, in his absence, any other lawful Minister that can be procured) with them that are present, call upon God..."

9. Quote Scriptural authority for the following extracts, and comment briefly on the doctrines involved in them:

(*a*) "Grant that we being regenerate, and made thy children by adoption and grace, may daily be renewed by thy Holy Spirit."

(*b*) "God, who as at this time didst teach the hearts of thy faithful people, by the sending to them the light of thy Holy Spirit."

(*c*) "Then we are guilty of the Body and Blood of Christ our Saviour; we eat and drink our own damnation, not considering the Lord's Body."

(*d*) "Baptism representeth unto us our profession."

10. Explain the terms—Rubric—Quinquagesima Sunday—Octave—reading, saying, singing—Vigil—Dominica in albis—Rogation days—Chrism—Chrisom.

11. Write out the Collect for Easter-day, and illustrate it from Scripture. What are the proper Lessons appointed for Morning and Evening Prayer on that day? Point out the bearing of each on the festival.

12. When, and for what purpose, is the Commination appointed to be read? In what points does this Service differ from the other forms in the Prayer-book?

13. Translate into LATIN:

(*a*) "The glorious company of the Apostles praise thee: the goodly fellowship of the Prophets praise thee: the noble army of Martyrs praise thee."

(*b*) "O God the Father, of heaven, have mercy upon us miserable sinners."

(*c*) "O Lord God, who seest that we put not our trust in any thing that we do; mercifully grant that by thy power we may be defended against all adversity." (Collect for Sexagesima Sunday).

Explain the wording of this Collect, as it stood in the Sarum Missal.

ECCLESIASTICAL HISTORY. FIRST THREE CENTURIES.

1. WHAT predictions or allusions occur in the New Testament respecting any heresies which were subsequently developed in the primitive Church?

2. What particulars may be gathered from the New Testament and the early fathers concerning (1) the places, (2) the seasons, and (3) the forms of Christian worship in primitive times?

3. State what you know of the history of the Church in Alexandria, and of its leading theologians in the second century.

4. Give some account of Marcion and his opinions.

5. State the views of Cyprian on the unity of the Church. How do they differ from those of the modern Church of Rome?

6. Give a sketch of the history of the Church during the reign of Diocletian, and trace the origin of his persecution.

THE REFORMATION IN ENGLAND.

1. GIVE a brief account of the Lollards and their opinions.

State the particulars of the death of William Sawtrey and of Lord Cobham.

2. What was Wycliffe's view of the Royal Supremacy?

Mention any statute affirming the Supremacy before the time of Henry VIII.

Mention the successive enactments of Henry VIII. concerning Appeals.

3. Give some account of the Suppression of the Monasteries under Henry VIII. What was the general effect on the condition of the Country?

4. Mention some of the books which were precursors of the Reformation.

Make observations on the "Bishops' Book" and Pole's Book "De Unitate Ecclesiæ."

Describe the religious condition of England in 1536. How does the state of parties develop itself in the Articles of 1536 in the view taken (1) of the Sacraments (2) of the use of Images (3) of the intercession of Saints?

5. Write an account of Bishop Fisher, Anne Askew, and Joan Bocher.

6. Mention any points in which Bucer and Melancthon influenced the English Protestants.

Describe the condition of the Reformation at the death of Edward VI.

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1. POINT the following passage:

וישמע את־דברי בני־לבן לאמר לקח יעקב את כל־אשר לאבינו ומאשר לאבינו עשה את כל־הכבד הזה: וירא יעקב את־פני לבן והנה איננו עמו כתמול שלשום: ויאמר יהוה אל־יעקב שוב אל־ארץ אבותיך ולמולדתך ואהיה עמך: וישלח יעקב ויקרא לרחל וללאה השדה אל־צאנו: ויאמר להן ראה אנכי את־פני אביכן כי־איננו אלי כתמל שלשם ואלהי אבי היה עמדי: ואתנה ידעתן כי בכל־כחי עבדתי את־אביכן: ואביכן התל בי והחלף את־משכרתי עשרת מנים ולא־נתנו אלהים להרע עמדי: אם־כה יאמר נקדים יהיה שכרך וילדו כל־הצאן נקדים ואם־כה יאמר עקדים יהיה שכדך וילדו כל־הצאן עקדים: ויצל אלהים את־מקנה אביכן ויתן־לי: ויהי בעת יחם הצאן ואשא עיני וארא בהלום והנה העתדים העלים על־הצאן עקדים נקדים וברדים: ויאמר אלי מלאך האלהים

בחלום יעקב ואמר הנני: ויאמר שא־נא עיניך וראה כל־העתדים
העלים על־הצאן עקדים נקדים וברדים כי ראיתי את כל־אשר
לבן עשה לך: אנכי האל בית־אל אשר משחת שם מצבה אשר
נדרת לי שם נדר עתה קום צא מן־הארץ הזאת ושוב אל־ארץ
מולדתך: ותען רחל ולאה ותאמרנה לו העוד לנו חלק ונחלה
בבית אבינו: הלוא נכריות נחשבנו לי כי מכרנו ויאכל
גם־אכול את־כספנו: כי כל־העשר אשר הציל אלהים מאבינו
לנו הוא ולבנינו ועתה כל אשר אמר אלהים אליך עשה:
ויקם יעקב וישא את־בניו ואת־נשיו על־הגמלים: וינהג
את־כל־ מקנהו ואת־כל־רכשו אשו רכש מקנה קנינו אשר רכש
בפדן ארם לבוא אל־יצחק אביו ארצה כנען: ולבן הלך
לגזז את־צאנו ותגנב רחל את־התרפים אשר לאביה: ויגנב
יעקב את־לב לבן הארמי על־בלי הגיד לו כי ברח הוא:
ויברח הוא וכלאשר־לו ויקם ויעבר את־הנהר וישם את־פניו
הר הגלעד: וינד ללבן ביום השלישי כי ברח יעקב: ויקח
את־אחיו עמו וירדף אחריו דרך שבעת ימים וידבק אתו בהר
הגלעד: ויבא אלהים אל־לבן הארמי בחלם הלילה ויאמר
לו השמר לך פן־תדבר עם־יעקב מטוב עד־רע: וישג לבן
את־יעקב ויעקב תקע את־אהלו בהר ולבן תקע את־אחיו בהר
הגלעד: ויאמר לבן ליעקב מה עשית ותגנב אתלבבי ותנהג
את־בנתי כשביות חרב: למה נחבאת לברח ותגנב אתי ולא־
הגדת לי ואשלחך בשמחה ובשירים בתף ובכנור: ולא נטשתני
לנשק לבני ולבנתי עתה הסכלת עשו: יש־לאל ידי לעשות
עמכם רע ואלהי אביכם אמש אמר אלי לאמר השמר לך
מדבר עם־יעקב מטוב עד־רע: ועתה הלך הלכת כי־נכסף
נכספתה לבית אביך למה גנבת את־אלהי:

2. Translate into HEBREW:

(1) Now, as soon as he arose in the morning, he saddled his ass, and set out, to go to the place of which his sons had told him. (2) Shall I find room, in your father's town, for my men to lodge; and will there be fodder for my camels? (3) He was rich in neat cattle, sheep, and camels, and had many slaves both male and female. (4) She lived sixty-four years, and had twelve sons and three daughters. (5) Having encamped at night on the bank of the river, they crossed over as soon as the sun rose. (6) He feared lest the enemy should fall on his men, and slay them with the edge of the sword, and carry captive the women and children. (7) We sold our brother for thirty pieces of silver, and now his blood is required at our hands. (8) Where have ye hidden the cup of my lord?

3. Translate into HEBREW:

Beginning, *Εὐλογητὸς ὁ Θεὸς, κ.τ.λ.*

Ending, *οἱ περὶ τῆς εἰς ὑμᾶς χάριτος προφητεύσαντες.*—1 Pet. i. 3.

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1. TRANSLATE: (1) Gen. xxi. (2) Gen. xlii.
2. Analyse the following verbs:

וַיָּרֻאוּ תִרְעָה וְשִׁתָּחֲווּ וַיִּכֶּר הִתְבָּחֲנוּ·

3. Affix the pronoun *their*, *m.* to the plural of the following nouns:

בַּיִת בַּת אֹהֶל שֶׂה גָּמָל לָשׁוֹן יָד רֶגֶל·

4. Translate, adding such notes as you think needful: (1) Ps. ii. 10—12. (2) Ps. iv. (3) Ps. xviii. 4—16. (4) Ps. xxii. 13—19. (5) Ps. xxxv. 7—17. (6) Ps. xlv.

THE SEPTUAGINT. BOOK OF EXODUS.

TRANSLATE and explain the passages cited, and mark any peculiarities in the language, tracing them to their origin.

1. Beginning, Κατέβη δὲ ἡ θυγάτηρ Φαραὼ λούσασθαι ἐπὶ τὸν ποταμόν, κ.τ.λ.
   Ending, τὴν μητέρα τοῦ παιδίου.—ii. 5—7.
2. Beginning, Καὶ εἶπε Μωυσῆς πρὸς τὸν Θεὸν, κ.τ.λ.
   Ending, καὶ μνημόσυνον γενεῶν γενεαῖς.—iii. 13—15.
3. Beginning, Εἶπε δὲ Μωυσῆς πρὸς Κύριον, δέομαι, Κύριε· κ.τ.λ.
   Ending, καὶ συμβιβάσω σε ὃ μέλλεις λαλῆσαι.—iv. 10—12.

Compare this with the original, or with the English Version.

4. Beginning, Ἐλάλησε δὲ ὁ Θεὸς πρὸς Μωυσῆν, κ.τ.λ.
   Ending, καὶ τὸ ὄνομά μου Κύριος οὐκ ἐδήλωσα αὐτοῖς.—vi. 2, 3.

Compare this with the original, and shew how this passage is confirmed by the evidence of compound Hebrew names of persons.

5. Καὶ εἶπε Κύριος πρὸς Μωυσῆν, λέγων, ἰδοὺ δέδωκά σε θεὸν Φαραὼ, καὶ Ἀαρὼν ὁ ἀδελφός σου ἔσται σου προφήτης.—vii. 1.
6. Beginning, Καὶ παραδοξάσω ἐν τῇ ἡμέρᾳ ἐκείνῃ τὴν γῆν Γεσὲμ, κ.τ.λ.
   Ending, ὁ Θεὸς πάσης τῆς γῆς.—viii. 22.
7. Καὶ ἐβάρυνε Φαραὼ τὴν καρδίαν αὐτοῦ.—viii. 32.
   Ἐβαρύνθη ἡ καρδία Φαραώ.—ix. 7.
   Ἐσκλήρυνε δὲ Κύριος τὴν καρδίαν Φαραώ.—ix. 12.
8. Beginning, Καὶ διελεύσομαι ἐν γῇ Αἰγύπτῳ ἐν τῇ νυκτὶ ταύτῃ, κ.τ.λ.
   Ending, ὅταν παίω ἐν γῇ Αἰγύπτῳ.—xii. 12, 13.

Explain the prophetic relation of the Passover to the Redemption of CHRIST.

9. Beginning, Καὶ εἰσῆλθον οἱ υἱοὶ Ἰσραὴλ, κ.τ.λ.
   Ending, εἰς μέσον τῆς θαλάσσης.—xiv. 22, 23.
10. Ἀμμὼν, ἡ κατοικοῦσα ἐν ποταμοῖς· ὕδωρ κύκλῳ αὐτῆς, ἧς ἡ ἀρχὴ θάλασσα καὶ ὕδωρ τὰ τείχη αὐτῆς.—Nahum iii. 8.

How does the Septuagint version of this passage help to ascertain the true Hebrew text?

11. Beginning, Καὶ ἀπῆρε πᾶσα συναγωγὴ, κ.τ.λ.
    Ending, οὐκ ἦν δὲ ὕδωρ τῷ λαῷ πιεῖν.—xvii. 1.
12. Beginning, Εἶπε δὲ Κύριος πρὸς Μωυσῆν, κ.τ.λ.
    Ending, ἐπὶ Ἀμαλὴκ ἀπὸ γενεῶν εἰς γενεάς.—xvii. 14—16.

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1. What is the time occupied by the history of this book? Give a summary of the events.

2. Luther said of Genesis: *Est autem hic liber valde Evangelicus;* apply this to the book of Exodus.

3. Give a description of the peninsula of Sinai, and draw a sketch, shewing the probable position of the Israelites in Egypt, the Nile, the passage of the Red Sea, and the march to Sinai.

4. Are there any passages in this book where the Septuagint Version helps (1) To ascertain the true Hebrew Text. (2) To determine the question with regard to the inspiration *of the Translators?*

5. Are there any important variations from the original in the Septuagint version of Exodus?

6. What other versions are derived from the Septuagint?

7. What are the principal MSS. of the LXX.; their respective ages, and characters?

8. Which is supposed most nearly to represent the ancient text of the LXX. and which the corrected Hexaplar text of Origen?

9. Describe the labours of Origen on this Version; and the following editions: Romana, 1587; Baber's; Tischendorf's.

10. Mention two passages in the Psalms, one prophetic of the Crucifixion, the other of the Resurrection, of Christ; where the LXX. Version helps to ascertain the true Hebrew Text.

THE EPISTLE OF ST. PAUL TO THE ROMANS.

1. WHAT is to be gathered from the internal evidence of this Epistle with regard to *the composition* of the Roman Church? State the difficulty connected with this point, and shew how it may be obviated.

2. Give a concise analysis of the contents of the Epistle with special reference to the great doctrine which it advocates. Do you trace in it any relation to the Epistle to the Galatians?

3. Beginning, Ὅταν γὰρ ἔθνη τὰ μὴ νόμον ἔχοντα, κ.τ.λ.
Ending, ἢ καὶ ἀπολογουμένων.—chap. ii. 14, 15.

Paraphrase these verses. Taken in connection with the whole argument in which they occur, what do they appear to you to assert with regard to the moral and religious condition of the heathen world?

4. Explain fully, either by a translation with notes, or by a running commentary, the following passage:
Beginning, Διὰ τοῦτο ὥσπερ, κ.τ.λ.
Ending, τοῦ ἑνὸς δίκαιοι κατασταθήσονται οἱ πολλοί.—chap. v. 12—19.

How far is the distinction between the *obedientia activa* and *obedientia passiva* of our Lord supported by vv. 18, 19, or by any other part of this Epistle?

5. What remarks, exegetical or critical, have you to make on the following passages?

(*a*) Τοῦ ὁρισθέντος υἱοῦ Θεοῦ ἐν δυνάμει, κατὰ πνεῦμα ἁγιωσύνης, ἐξ ἀναστάσεως νεκρῶν.

(*b*) Ὃς παρεδόθη διὰ τὰ παραπτώματα ἡμῶν, καὶ ἠγέρθη διὰ τὴν δικαίωσιν ἡμῶν.

(*c*) Μόλις γὰρ ὑπὲρ δικαίου τὶς ἀποθανεῖται· ὑπὲρ γὰρ τοῦ ἀγαθοῦ τάχα τὶς καὶ τολμᾷ ἀποθανεῖν.

(*d*) Ἀληθείαν λέγω ἐν Χριστῷ, οὐ ψεύδομαι, συμμαρτυρούσης μοι τῆς συνειδήσεώς μου ἐν πνεύματι ἁγίῳ, ὅτι λύπη μοί ἐστι μεγάλη, καὶ ἀδιάλειπτος ὀδύνη τῇ καρδίᾳ μου· ηὐχόμην γὰρ αὐτὸς ἐγὼ ἀνάθεμα εἶναι ἀπὸ τοῦ Χριστοῦ ὑπὲρ τῶν ἀδελφῶν μου, τῶν συγγενῶν μου κατὰ σάρκα.

(*e*) Ἐὰν οὖν πεινᾷ ὁ ἐχθρός σου, ψώμιζε αὐτόν· ἐὰν διψᾷ, πότιζε αὐτόν· τοῦτο γὰρ ποιῶν, ἄνθρακας πυρὸς σωρεύσεις ἐπὶ τὴν κεφαλὴν αὐτοῦ.

6. Point out instances in this Epistle in which the use of different words in the authorised version to express the same word in the original Greek appears to you objectionable. What are the grounds on which the Translators defend such variety? Do you think them valid? What is the Greek for "salute Urbane"?

7. *a*. Discuss the meaning of any one of the following terms as used in this Epistle:

δικαιοσύνη Θεοῦ, ἀπολυτρώσις, ἱλαστήριον, σάρξ, νόμος, μυστήριον.

β. How far do you think the introduction of the article influences the meaning of νόμος in this or other writings of St. Paul?

γ. Distinguish between ὑβριστάς, ὑπερηφάνους, ἀλαζόνας, which occur together in ch. i. v. 30.

8. Write down in Greek the Doxology which in the Textus Receptus concludes the Epistle, and discuss its genuineness and position.

TERTULLIAN, DE IDOLOLATRIA, AND DE CORONA MILITIS.

1. State the arguments from internal evidence for approximately fixing the date of these two treatises. What other extant writings of Tertullian may be classed with them, and why?

2. Who was Montanus? What were his opinions? Trace the influence of those opinions in these two treatises of Tertullian. What lost work did Tertullian write in defence of Montanus?

3. How does Tertullian define Idolatry? What rule does he lay down as to the participation of Christians in the heathen festivals? How, and on what grounds, does he decide the question whether Christians might bear office in heathen countries?

4. "Sed ait quidem adversus similitudinis interdictæ propositionem, Cur ergo Moses in eremo simulacrum serpentis ex ære fecit"? How does Tertullian answer this question?

5. "Et facile est statim exigere, ubi scriptum sit ne coronemur" Give Tertullian's reply. What functions does he ascribe to faith and reason, respectively?

6. Translate the following passages, and comment on peculiar phrases and allusions:—

(1) Beginning, Si ita necessitas exhibitionis extenditur, etc.
Ending, Minor merces frequentiore actu repensatur.—*De Idol.* §. 8.

(2) Beginning, Nobis, quibus sabbata extranea sunt, etc.
Ending, Nos, ne ethnici pronuntiemur, non veremur.—*Ib.* §. 14.

Illustrate the words "Nobis, quibus sabbata extranea sunt," (α) from St. Paul's Epistles; (β) from Justin Martyr.

(3) Beginning, Dehinc ter mergitamur amplius aliud respondentes quam Dominus in Evangelio determinavit, etc.
Ending, vel geniculis adorare.—*De Corona Milite*, §. 3.

When was it first decreed that fathers should not be sponsors?

(4) Beginning, Quis denique patriarches, etc.
Ending, Imagini veritas respondere debebit.—*Ib.* §. 9.

(5) Beginning, Tanto abest, ut capiti suo munus inferat idololatriæ, etc.
Ending, omnes aculeos mortis in dominici capitis tolerantia obtundens.—*Ib.* §. 14.

To what passages of Scripture does Tertullian allude in the above extract?

JUSTIN MARTYR'S DIALOGUE WITH TRYPHO, CHAPS. 1—74.

I. What works of Justin are extant? Distinguish the genuine from the spurious.

II. Quote any passages from the dialogue which enable you to fix its date or which appear to decide the question whether it actually took place. Is there any allusion to the continuance of miraculous powers in the Church at the time when it was written?

III. Translate:

Ἀλλ' οὐ τοιοῦτον ὁποῖον καὶ ἐφ' ἡμῶν γινόμενον ἀρῶμεν; Λόγον γάρ τινα προβάλλοντες, λόγον γεννῶμεν, οὐ κατ' ἀποτομήν, ὡς ἐλαττωθῆναι τὸν ἐν ἡμῖν λόγον, προβαλλομενοι.

What is Justin attempting to illustrate here?

IV. Beginning, Τί ποτε δ' ἐστὶ φιλοσοφία, κ.τ.λ.

Ending, μιᾶς οὔσης ταύτης ἐπιστήμης.—cap. 2.

Give some account of the philosophical schools here alluded to, and explain their connection with the career of Justin.

V. What heresies are mentioned by name in this dialogue? Give an account of them.

VI. What is the original of the following sentence?

Ἀνηγγείλαμεν ἐναντίον αὐτοῦ ὡς παιδίον, ὡς ῥίζα ἐν γῇ διψώσῃ.

What Greek versions of the Old Testament were extant when Justin wrote? Which does he quote? Can you give the other versions of this passage?

VII. Translate, explaining the allusions to the Old Testament.

(α) καὶ οἱ ἐν νηστείᾳ δὲ τράγοι δύο ὅμοιοι κελευσθέντες γίνεσθαι, ὧν ὁ εἷς ἀποπομπαῖος ἐγένετο, ὁ δὲ ἕτερος εἰς προσφοράν, τῶν δύο παρουσίων τοῦ Χριστοῦ καταγγελία ἦσαν.

(β) καὶ γὰρ τὸ κόκκινον βάμμα περιτιθέναι αὐτοῖς ἐνετείλατο ὑμῖν, ἵνα διὰ τούτου μὴ λήθῃ ὑμᾶς λαμβάνῃ τοῦ θεοῦ. καὶ φυλακτήριον ἐν ὑμέσι λεπτοτάταις γεγραμμένων χαρακτήρων τινῶν, ἃ πάντως ἅγια νοοῦμεν εἶναι, περικεῖσθαι ὑμᾶς ἐκέλευσε, καὶ διὰ τούτων δυσωπῶν ὑμᾶς ἀεὶ μνήμην ἔχειν τοῦ θεοῦ, ἅμα τε καὶ ἔλεγχον ἐν ταῖς καρδίαις ὑμῶν.

VIII. Translate with brief explanatory notes:

Beginning, καὶ γὰρ βρωμάτων τινῶν ἀπέχεσθαι προσέταξεν ὑμῖν, κ.τ.λ.

Ending, οὐχ ὡς ἐξηγεῖσθε πιστευτέον.—cap. 20.

IX. Translate:

ἄνδρας ἐκλεκτοὺς ἀπὸ Ἱερουσαλὴμ ἐκλεξάμενοι τότε ἐξεπέμψατε εἰς πᾶσαν τὴν γῆν λέγοντες αἵρεσιν ἄθεον Χριστιανῶν πεφηνέναι. καταλέγοντές τε ταῦτα ἅπερ καθ' ἡμῶν οἱ ἀγνοοῦντες ἡμᾶς πάντες λέγουσιν.

Illustrate this statement by reference to other Patristic testimony. Does it receive any support from any passages of the New Testament?

BUTLER'S ANALOGY AND PALEY'S HORÆ PAULINÆ, I to V.

1. What is the design of Butler's Analogy? State in what respects Butler regards Analogy as available for the defence of Religion.

2. Reply to the objection which urges that several observations in favour of a future life are equally applicable to the case of brutes.

3. Our trials, difficulties and dangers, in our temporal and our religious capacity are evidently analogous.

4. The present world is peculiarly fit to be a state of discipline for the improvement in virtue and piety of such persons as will set themselves to improve.

5. Reply to the objection that there is some peculiar presumption, from analogy, against miracles after the settlement and during the continuance of a course of nature.

6. Mention a way of arguing, which, though just with regard to other writings, is not applicable to the prophetic parts of Scripture.

7. The disorderly exercise of some of the miraculous powers conferred on the Early Christians produces no objection against their being really miraculous.

8. How doea Butler meet objectiona against the wisdom, justice, and goodness, of Christianity?

9. The difficulties in which the evidence of Religion is involved, form no more just ground of complaint than the external circumstances of temptation to which aome persona are exposed.

10. "Agreement between letters bearing the name of an ancient author and a received history of that author's life does not neceaaarily eatablish the credit of either."

Justify thia statement and from the circumatances deduce a teat of truth applicable to every supposition in the case.

11. Give the arguments based on the following passage:

Rom. xv. 19. "So that from Jerusalem and round about unto Illyricum I have fully preached the Gospel of Christ."

12. Acts xix. 21, 22. "After these things were ended Paul purposed in the spirit, when he had passed through Macedonia and Achaia, to go to Jerusalem; saying, after I have been there I must alao see Rome; so he sent into Macedonia two of them that ministered unto him, Timotheus and Erastus."

What uae doea Paley make of thia?

How many viaits to Corinth doea Paley recognise? State your own view and point out how far Paley's arguments ought to be modified on the aupposition of hia being mistaken.

13. The opening of the aecond Epistle to the Corinthians exhibits a connection with the Acts of the Apostles which alone would satisfy some persons that the Epistle was written by St. Paul and under the circumatancea mentioned in the history.

14. "The Epistle to the Galatians and the Acts of the Apostlea were written without any communication with each other."

EXAMINED AND APPROVED FOR HONOURS.

The Names in each Class are arranged in Alphabetical Order.

MIDDLE BACHELORS.

Class I.

Ds * Bothamley	Trin.

Class II.

Ds Brown	Caiua
Clayton	Emman.
Evana	Corpus
† Grist	Joh.
Marsden	Joh.
Pettitt	Trin.
Shaw	Trin.

Class III.

Ds Howell	Cath.
Nicholls	Joh.
Nixon	Corpua

COMMENCING BACHELORS.

Class I.

Class II.

Ds Blofeld	Trin.
Clark	Joh.

Class III.

Ds Northey	Trin.

* Scholefield Prize for Biblical Greek. † Distinguished in Hebrew.

EXAMINED AND APPROVED.

Ds Abell	Sid.	Ds Hardy	Christ's	Ds Rogers	Trin.
Ambrose	Corpus	Harvey	Christ's	Royds	Trin.
Arden	Christ's	Harvey	Joh.	Sainsbury	Trin.
Armitage	Emman.	Hodgson	King's	Salvin	Christ's
Athawes	Clare	Hudson	Trin.	Sanders	Joh.
Attwood	Emman.	Hulbert	Caius	Sandys	Corpus
Baker	Caius	Hunnybun	Caius	Scholefield	Emman.
Benson	Magd.	Ingles	Trin.	Sheffield	Trin. H.
Blissard	Emman.	Jenkin	Joh.	Sheild	Clare
Bower	Trin.	Jones	Cath.	Shepherd	Trin.
Boys	King's	Kelly	Trin. H.	Sitwell	Joh.
Braithwaite	Clare	Kemble	Trin.	Skipworth	Emman.
Brereton	Joh.	Langshaw	Joh.	Slater	Trin. H.
Brown	Cath.	Leach	Caius	Sparrow	Clare
Castley	Pemb.	Marshall	Pet.	Stanwell	Joh.
Clark	Magd.	Mathews	Joh.	Starky	Magd.
Clint	Trin.	Meres	Emman.	Steward	Trin.
Coldham	King's	Monk	Trin.	Taylor	Joh.
Cornish	Sid.	Morse	Trin.	Todd	Trin.
Curtois	Sid.	Nelson	Jes.	Turnbull	Trin.
Custance	Joh.	Newton	Emman.	Twist	Magd.
Day	Joh.	Noble	Joh.	Walbran	Pemb.
Dickson	Trin.	Parez	Pemb.	Wale	Magd.
Dover	Jes.	Pierpoint	Joh.	Walsham	Magd.
Flintoff	Emman.	Pinney	Caius	Warwick	Magd.
Fowler	Trin.	Potts	Joh.	Watkins	Caius
Francis	Joh.	Pretyman	Trin.	Webb	Joh.
Geary	Corpus	Price	Joh.	Williams	Christ's
Gray	Trin.	Quilter	Pet.	Winslow	Caius
Griffith	Emman.	Rigby	Trin.	Wood	Joh.

B.L. EXAMINATION, MAY, 1861.

EXAMINERS:

J. T. ABDY, LL.D., *Trinity Hall.*
JOSEPH SHARPE, LL.D., *Jesus College.*
HERBERT BROOM, M.A., *Trinity College.*
C. S. CALVERLEY, M.A., *Christ's College.*

CANDIDATES.

Brigstock	Trin.	Hopkins	Emm.	Salts	Joh.
Buck	Clare	Mac Laughlin	Magd.	Tremaine	Pet.
Climenson	Trin.	Porch	Trin.	Westby	Magd.
Hall	Magd.				

ROMAN LAW.

1. ENUMERATE the principal modes of acquiring property peculiar to the Roman Law.

2. State the Roman Law with respect to the use of, and the property in, the banks of a river.

3. Define "Traditio." To what species of property did it apply?

4. Define "Res Corporales" and "Res Incorporales."
Do these definitions accord with those of Corporeal and Incorporeal hings in the English Law?

5. What was "Ususfructus"? Point out some of the modes by which t might be terminated.

6. Define "Usucapio" and "Possessio longi temporis." After what eriods could, according to the law at the time of Justinian, the ownership e acquired by possession?

7. What were the forms of testament in use anterior to the time of ustinian? Describe the formalities requisite to the validity of each.

8. Describe fully the form of testament in use at the time of Justinian.

9. Define "Substitutio vulgaris" and "Substitutio pupillaris."

10. What was the "actio de inofficioso testamento"?
In what cases could it be brought, and when was the right to it xtinguished?

11. What was a "Fideicommissum"? Define "Fidei committens," 'Heres fiduciarius," and "Fideicommissarius."

12. What were the provisions of the Lex Falcidia and the Senatusonsultum Pegasianum?

INSTITUTES OF JUSTINIAN.

TRANSLATE:

1. Beginning, Non tamen cuicumque volenti manumittere licet: etc.
Ending, vel qui, datis libertatibus, desiturus est solvendo esse. —Lib. I. tit. 6.

2. Beginning, Est autem capitis deminutio prioris status mutatio: etc.
Ending, est capite deminutus.—Lib. I. tit. 16.

3. Beginning, Is vero, ad quem ususfructus fundi pertinet, etc.
Ending, Recte enim colere, et quasi bonus paterfamilias uti, lebet.—Lib. II. tit. 36.

4. Beginning, Liberis suis impuberibus, etc.
Ending, id est, duarum hæreditatum.—Lib. II. tit. 16.

DIGEST, BOOK I., TIT. II.

TRANSLATE:

Beginning, Facturus legum vetustarum interpretationem, etc.
Ending, evidentiorem præstant intellectum.
Beginning, Post originem juris et processum cognitum, etc.
Ending, non erat fas ultra sextum mensem retinere.
Beginning, Et quum placuisset leges quoque ferri, etc.
Ending, Ita rursus respublica suum statum recepit.
Beginning, Servius quum in causis orandis primum locum, etc.
Ending, reliquit autem prope centum et octoginta libros.

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1. WHAT is meant by the Municipal Law of England? Into what two lasses is it divisible?

2. Define "tenement," "hereditament," "chattel."

3. Distinguish between the "absolute" and "relative" rights of individuals.

4. Mention any recent instance of a conflict between the Courts of Law and the House of Commons in regard to privilege asserted by the latter.

5. What is the ordinary twofold division of property?

6. "Caveat Emptor." Put cases illustrating the legal meaning of this maxim.

7. When are slanderous words actionable without proof of special damage?

8. What is the Writ of *Habeas Corpus ad subjiciendum?* Under what circumstances is it efficacious?

9. Mention instances to shew that mercantile usages and customs have become blended and incorporated with our Common Law.

10. In what respects does a "simple" differ from a "special" contract?

11. "Nemo debet bis vexari pro eadem causa." How is this maxim to be understood? Are there restrictions on its applicability?

12. Put various states of facts in each of which an act *primâ facie* criminal may be excused or justified.

13. What right is vested by our Common Law in the finder of lost property?

14. What is the supposed derivation of the term "felony"? And what incidents are peculiar to it under our Common Law?

GENERAL JURISPRUDENCE AND HINDOO AND MOHAMMEDAN LAW.

1. Give Bentham's definitions of the Principle of Utility, and of Sympathy and Antipathy. State your reasons for approving or condemning these principles.

2. Define the Sanction of a Law, and mention Bentham's four Sanctions.

3. Distinguish between 'direct' and 'indirect' methods of preventing crime.

HINDOO LAW.

1. A man having two sons leaves *all* his property to the younger; is this gift valid? If the gift has been made, can it be set aside?

2. What is the general principle of law (applicable to all the schools,) with reference to the order of succession? What is the true meaning of this principle?

3. Does the Roman and English maxim 'consensus non concubitus facit nuptias' hold any place in the Hindoo jurisprudence? What is the peculiarity of the *Asura* and *Gándharva* marriages?

4. State briefly the legal position of an adopted son with reference to (*a*) his natural and (*b*) his adoptive family.

5. Which of the maxims 'caveat emptor,' 'caveat venditor' is recognized in the Hindoo law of contracts?

A walks into *B*'s shop and asks to look at a piece of cloth, which on inspection is perfectly good; *A* accordingly orders it to be sent to his house, but instead of that piece of cloth another of an inferior description is forwarded: what remedy has *A* got in this case? besides that remedy, can *B* be punished in any way?

MOHAMMEDAN LAW.

1. In the Mohammedan law of inheritance what is meant by the expressions Increase and Return?

2. What is the rule with reference to 'commorients'? Does it resemble at all the English rule on the subject?

3. How is the contract of sale effected? What is the Mohammedan rule on the subject of warranty?

4. How far is consent necessary to the Mohammedan contract of marriage? What are the conditions required of the contracting parties?

5. Two persons having entered into a contract by deed, a dispute arises between them; at the trial the deed is offered in evidence, but is found to be informal: what is the effect of such informality upon the contract?

HALLAM, CONSTITUTIONAL HISTORY OF ENGLAND.

1. On what grounds did the Parliament limit the King's revenue, and how far was his consequent 'dissatisfaction' reasonable? Explain the general principle of an Appropriation Act, such as was then passed.

2. How was the resumption of the King's Irish grants effected? Does he appear to have been guilty of an unconstitutional act on this or on any other occasion?

3. What was in William's time, and what is now, the state of the law of libel?

4. What led to the anti-popery Act of 1700: what were its provisions, and why does Hallam stigmatize it as "disgraceful"?

5. Give a sketch of the original constitution of the Privy Council, and of the way in which it became superseded by the Cabinet.

6. What was originally the distinctive character of 'whigs' and 'tories'? What does Hallam mean by calling the Act of Settlement "the complement of the Revolution and the Bill of Rights"?

7. Discuss the justice of the impeachments of Oxford and Bolingbroke, and state the points in dispute between the Houses in the case of Ashby and White.

8. What attempts have been made, and on what grounds, to establish triennial Parliaments? What was, and is, meant by 'parliamentary privilege'? Mention any important cases on record of commitment for breach of privilege.

9. Give a brief account of the Scottish Court of Session.

10. How was the state of Scotland, and how was that of Ireland, especially affected by the fall of the Stuarts?

EXAMINED AND APPROVED.

Brigstock	Trin.	Hopkins	Emm.	Salts	Joh.
Buck	Clare	Mac Laughlin	Magd.	Tremaine	Pet.
Climenson	Trin.	Porch	Trin.	Westby	Magd.
Hall	Magd.				

FIRST M.B. EXAMINATION, May, 1861.

EXAMINERS:

W. Clark, M.D., *Trinity College.*
H. J. H. Bond, M.D., *Corpus College.*
H. B. Leeson, M.A., *Caius College.*
W. H. Drosier, M.D., *Caius College.*
C. Lestourgeon, M.A., *Trinity College.*
C. C. Babington, M.A., *St. John's College.*
G. D. Liveing, M.A., *St. John's College.*

CANDIDATES.

W. B. Cheadle	B.A.	Caius	J. J. Mackenzie	Caius
J. C. Fish	B.A.	Caius		

HUMAN ANATOMY AND PHYSIOLOGY.

1. Give the origin and insertion of the muscles acting on the eyeball: state distinctly the various movements produced by these muscles, and the sources from whence they derive their Nerves.

2. Give the anatomy of the Testis; where is this organ situated in fœtal Life, and how is the Tunica Vaginalis formed?

3. Mention briefly the points of attachment of the Diaphragm. State accurately the situation of its openings; and enumerate the objects which respectively pass through them.

4. Describe briefly the course of the pneumo-gastric nerve and its principal branches. What inferences have been drawn from experiment regarding its function?

5. How are the two sounds of the Heart produced? and what theories have been formed regarding the cause of its rhythmical action?

6. Show from Anatomy and experimental inquiry that the fifth pair of nerves resembles a spinal nerve, and give the situation of the various Ganglia met with in the course of these nerves.

7. What do you understand by the term Vascular glands? State what is known of the minute Anatomy and function of any one of them.

8. A segment of a transverse section of a long bone (properly prepared) is placed under a microscope; explain fully (illustrated if you please by diagram) the objects presented to view. How are long bones said to increase *a*. In length. *b*. In breadth?

9. Give a general description of a rib. Point out some of the peculiarities by which the ribs are distinguished one from another, and the object gained by such differences.

10. Describe the shoulder-joint. State accurately the humeral attachment of those muscles immediately surrounding it, and the influence which each of them has upon the motion of the joint.

11. Give the origin, and describe the course of the arteries which supply the large and small intestines with blood, and mention the principal situation of Brunner's, Peyer's, and the Lieberkühnian glands.

12. In dissecting the Neck, what are the various objects progressively brought into view in order to expose the Scalenus Anticus muscle?

COMPARATIVE ANATOMY AND PHYSIOLOGY.

1. Describe the particulars of structure which shew that the Echinoderms form a group of animals essentially separate from the Polyps and Acalephs.

2. What difference of position with regard to the skeleton is assumed by the nerves and the ambulacral canals in the Echini and the Asteriæ?

3. Shew that the nervous ring surrounding the mouth of Echinoderms does not represent the ring surrounding the œsophagus of Arthropods and Molluscs; or, otherwise, state in what position the central parts of the nervous system are to be found in the first named group.

4. A respiratory organ may be formed in any part of an animal where the circulating fluid can be brought into near contact with the medium in which the animal lives. Illustrate this by noting the position of the respiratory organs in several orders of Crustaceans.

5. Describe, in the common cockle, the pallial chamber with its syphons, the course of the afferent current which conveys the oxygen for respiration: the passage of that currant into the intra-branchial chamber (which describe) and its exit therefrom into the expiratory portion of the pallial chamber. What is the moving force which effects the passage of the fluid inwards and outwards?

6. In these Molluscs is the heart arterial or venous? In the dibranchiate Cephalopods what additional moving power is introduced?

7. Name the lobes, single or in pairs, which make up the brain in

osseous fishes. What parts of the brain of Mammals do they represent, according to the observation of the fœtal development in the latter?

8. Of what bones in Birds is the osseous belt composed to which the Humerus is appended?

9. By what considerations are homologous parts or organs determined in animals, by what analogous parts? In what animals alone can relations of homology exist? Are the following analogous or homologous organs, viz. the gills of a fish and the lungs of a bird—the wings of a bird and the pectoral fins of a fish?

MATERIA MEDICA AND PHARMACY.

1. In collecting the different parts of plants, to be used as medicine, what rules should be observed as to the time of gathering, the preparation, and the preservation of them?

2. Describe the usual processes for the preparation of Tinctures. What menstrua are used, and how may the strength of these be conveniently tested?

3. What is the general character of Mixtures in Pharmacy? Give some examples of mixtures. Why should they be made at the time they are prescribed?

4. In what different forms is Iron used in Medicine, with what views, and in what doses?

5. What do you consider to be the usual modes of operation of such medicines as increase particular secretions? Apply your views to explain the operation of mercurial preparations.

6. Which of the following infusions—Inf. Calumbæ, Inf. Cinchonæ, Inf. Rhei, Inf. Rosæ,—are chemically incompatible with Sulphate of Iron, Carbonate of Soda, Tartrate of Antimony, and Bichloride of Mercury severally, and with each other? Give instances of medicines which are sometimes prescribed with advantage though they contain substances that react on one another; account for this.

7. In what doses are the following given, and what are their several physiological effects—Camphor, Jalap, Acid. Sulph. Dil., Sp. Ammon. Arom., Liq. Ammon. Acet. Magnes. Sulphas, Quinæ. Disulph., Ol. Ricini., Tinct. Digital?

8. In what forms is Iodine most often used internally, and in what doses? What inconveniences are likely to attend a too free use of it?

9. Why is the strength of medicinal Hydrocyanic Acid very liable to vary? What precautions should be taken in preserving it? Which of the various modes of preparing it do you prefer, and why?

10. Explain the advantages of combining in the same medicine substances the operation of which is similar. Give examples.

In addition to the above there was a viva voce Examination.

PATHOLOGY.

1. Define, in reference to Pathology, the following terms instancing each, *Temperament*, *Predisposition*, *Diathesis*, *Type*, *Dyscrasia*, *Cachexy*.

2. In what does the essential nature of true Hypertrophy consist distinguishing it from the spurious form? What are its causes? To what extent does hypertrophy of organs affect their functions? Describe some of its occasional effects on contiguous organs.

3. What are the physical characters of pus? What its chemical re-action? Give the microscopical description of the pus-corpuscle before and after

treatment by acetic acid. Can it be distinguished from a mucous or lymph corpuscle? What changes does pus undergo in a chronic abscess or cyst?

4. What condition of the minute arteries of the brain is frequently met with in cerebral apoplexy? Describe the appearance of an old apoplectic clot when the patient has survived the attack a considerable time.

5. How do you distinguish true ossification from mere calcareous degeneration? In what localities or organs are they severally most frequently met with? What is *eburnation* and where is it usually found?

6. Specialize the different pathological states or lesions which severally impair each of the following conditions necessary for maintaining the normal state of the respiratory function, viz.—Ingress of the air to the lungs generally—its access to the vesicular structure—circulation of the blood through the capillaries of the vesicle—the alternate expansion and contraction of the lungs as dependant firstly on the pulmonary structure itself and secondly on the mechanism of the thorax—innervation and cerebral influence.

7. To what disorders primary and secondary, and to what structural changes are the lymphatic glands especially liable? Does the minute anatomy of these organs, as at present ascertained, throw any light on the peculiarity of their pathology?

8. What are the chief pathological conditions determining the softening of organs, especially of the brain, stomach, liver, and spleen? Describe briefly this kind of lesion as it presents itself in each of these organs respectively.

9. Mention the causes which most usually give rise to *anæmia*. What are the general symptoms attending it? How do you account for the increased excitability of the nervous system which frequently accompanies it?

10. Point out the several states or conditions of secreting organs that conduce severally to excessive or defective secretion. Explain, with examples, how defective secretion may become a source of constitutional disturbance, when the secreting organs are excretory also.

11. Describe briefly the different morbid changes in structure and form that are found to occur in the valves of the heart, pointing out the causes that may induce these, and the sets of valves most frequently affected by each.

12. Give an account of the various morbid states that may give rise to Hæmatemesis. How will the prognosis be modified where it can be made out to which of these the hæmorrhage is due?

CHEMISTRY.

1. Explain the decomposition of water by Zinc and Sulphuric Acid, and give a symbolic formula thereof.

2. How are the Sulphates of Magnesia, Lime, Baryta, and Strontia to be chemically distinguished from each other?

3. Describe and explain the preparation of Iodine.

4. How may Potash and Soda and their salts be mutually distinguished?

5. Mention some of the most common natural products which contain Sulphur, stating the other substances with which it is combined in each case. Describe and explain one or more methods of preparing alkaline sulphides.

6. Give an account of the properties of Carbonic Acid; and explain how it may be detected in a mixture of gases. How may it be distinguished from Carbonic Oxide, from Nitrogen, from Sulphurous Acid, from Cyanogen?

7. State the chemical constitution of the rust of iron, and of copper. Explain how "galvanized iron" is able to resist the action of the atmosphere.

8. What is the action of Chlorine upon the following substances: (1) Soda, (2) Protosulphate of Iron, (3) Hydrosulphuric Acid, (4) absolute Alcohol?

9. Describe and explain the preparation of Tartaric Acid. Why is it said to be a *bibasic* acid? State the constitution of tartar-emetic, and point out the anomaly in its constitution, and mention some analogous compounds.

10. What is wood-spirit, and how obtained? Compare its chemical relations with those of Alcohol.

11. Describe the preparation and properties of Olefiant gas.

12. 10 grains of Acetate of Silver yielded by incineration 6·462 grains of pure silver, and another 10 grains yielded by combustion with Oxide of Copper,

5·277 grains of Carbonic Acid,
1·620 grains of water;

deduce from thence the equivalent and formula of Anhydrous Acetic Acid.

13. What are the four principal Types to which Gerhardt refers organic compounds?

14. How may the quantity of Alcohol in fermented liquors be readily determined without distillation?

There was also a practical examination in analysis.

EXAMINED AND APPROVED.

W. B. Cheadle	B.A.	Caius	J. J. Mackenzie		Caius
J. C. Fish	B.A.	Caius			

SECOND M.B. EXAMINATION, MAY, 1861.

EXAMINERS:

H. J. H. BOND, M.D., *Corpus College.*
W. W. FISHER, M.D., *Downing College.*
H. J. HAVILAND, M.D., *Pembroke College.*

CANDIDATES.

W. W. W. Andrew	B.A.	Caius	J. J. Mackenzie		Caius
P. W. Latham	B.A.	Down.	T. B. Partridge	B.A.	Joh.
R. Liveing	M.A.	Christ's			

SURGICAL DISEASES AND OBSTETRICAL MEDICINE.

1. WHAT local effects are produced by Scalds and Burns, and how would you treat them? To what constitutional symptoms and internal lesions do deep-seated Burns generally give rise?

2. What do you understand by the term Abscess? In what respect does the Abscess arising from the common boil differ from that arising from a scrofulous affection of a subcutaneous gland? What is your opinion respecting the opening of Abscesses in general? and mention some of the cases in which that treatment ought to be adopted.

3. Describe the symptoms which distinguish the following diseases of the eye, Cataract, Glaucoma, Amaurosis. On the lesion of what parts of the eye do they respectively depend?

4. What congenital disorder do the roof of the Mouth and the Uvula sometimes offer, and what inconveniences proceed therefrom? What symptoms does an elongated Uvula give rise to, and how would you treat the complaint? Mention some of the causes on which Dysphagia may depend.

5. Explain the meaning you attach to the following terms, Caries, Exostosis, Necrosis. To what constitutional conditions is Caries most frequently due?

6. Describe the tissues which respectively characterize the following Morbid Growths, Polypi, Schirrous Cancer, Medullary Sarcoma. What effects do they give rise to in the neighbouring parts? Is the removal of them by means of an operation usually followed by permanent success?

7. To what disease is the term Hernia Humoralis applied, and on what causes does it chiefly depend? How would you distinguish it from Hydrocele? In what does the operation for the cure of the latter disease consist?

8. State your opinion respecting the efficacy of Paracentesis in Empyema and Ascites.

9. On what local and general conditions may Leucorrhœa depend? By what means may ulceration of the Os Tineæ be observed and what treatment is usually adopted in such cases? Describe the symptoms which accompany Prolapsus Uteri.

10. Describe the stages of Natural Labour. What conditions in Labour require the interference of art, either by the hand alone, or armed with the forceps? To what complaints is the female peculiarly liable after parturition?

11. In what parts is the Embryon usually lodged in Extra-Uterine Pregnancy? Mention the disorders of development the fœtus most frequently exhibits, and describe the conformation of the skull in congenital Hydrocephalus.

12. What is meant by the term Abortion, and what precautions should females, who have been subject to miscarriage, take during pregnancy?

MEDICAL JURISPRUDENCE.

1. Describe the symptoms of poisoning by *Opium:* and mention the tests for *Morphia* and *Meconic acid.*

2. What do you consider to be a poisonous dose of the *extract of Belladonna?* What are the symptoms of poisoning by this substance, and the most appropriate treatment?

3. In what respect does *Oxalic acid* differ from other vegetable acids? For what salt is it occasionally mistaken, and how would you detect its presence in an organic mixture?

4. Mention the different salts that are usually contained in spring water, and state how each may be detected.

5. Explain the various modes of dying by *Asphyxia, Asthenia, Syncope,* and *Coma:* and describe the post mortem appearances found in each case.

6. In the case of a dead body found submerged in water, how would you determine whether or not death was caused by drowning?

7. What means would you adopt for restoring animation in a body that presented the characters of apparent death from submersion in water?

8. What is the meaning of the term *Atelectasis;* and from what causes is it supposed that this condition may proceed?

9. Enumerate the various predisposing and exciting causes of Insanity: and name those diseases that are most liable to be mistaken for this affection.

10. Indicate the leading symptoms of the following forms of Insanity, *Mania, Monomania, Dementia,* and *Amentia.*

PATHOLOGY AND PRACTICE OF PHYSIC.

1. Compare the physical conditions presented by the lung or a portion of lung in cadaveric congestion, œdema, first and second stage of pneumonia, and pulmonary apoplexy.

2. What are the various conditions to which *Hæmaturia* may be referred? State the diagonsis and the appropriate treatment in each of the varieties of its occurrence.

3. Give the diagonsis between ascites, pregnancy, and ovarian dropsy; and describe succinctly the different varieties of ovarian tumors.

4. What are the local peculiarities of the acute inflammation in gout? What are the physical characters and chemical nature of the so-called chalky deposits? What tissues do they principally invade, and how are they distinguishable from the lesions produced by rheumatic arthritis? What are the conditions of the blood and the urine in gout, and how according to recent views do these conditions suggest an explanation of its pathology?

5. What are the symptoms, pathology, and treatment of lead-poisoning? What other disease does it occasionally predispose or give rise to?

6. State some of the principal grave disorders, general or local, which are simulated by hysteria, and how in each case the diagnosis may be determined.

7. As a general rule in Therapeutics in what class of diseases and in what stage of the same disease would you enjoin bodily rest, and on the contrary under what circumstances would you recommend bodily exertion?

8. How do you explain the frequently almost entire absence of fat in the diabetic patient? Describe the different modes in which various organs are invaded by a morbid development of fat. Can you trace any correspondence between these differences and the different modes under which fat or its analogues permanently or temporarily occur as normal constituents or products of various tissues or organs?

9. Can you assign any probable explanation to account for the stage of *incubation* in certain diseases, as in variola, scarlatina, hydrophobia? Describe the different phases, with their dates, of the variolous pustule, and give the diagnosis between the efflorescence of scarlatina and rubeola.

10. What treatment would you adopt in protracted cases of *Bright's disease?* What is the significance of the diminution of the albuminuria and decrease of the specific gravity of the urine when they are observed to occur in the course of this disease?

11. Describe an attack of *cynanche parotidæa.* What grave disorders are occasionally incidental to it?

12. Describe a paroxysm of *angina pectoris.* How would you treat it?

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