

the bed and requiring the water to transport it to the mouth, where it must be ejected in front of the stream, thus rapidly extending it gulfward and reducing the slope. It is found that at the two lateral outlets known as Cubitt's Gap and the Jump the river has deposited about 150 square miles of sediment in thirty years, reclaimed that much land and the navigable channels have not been impaired. To have accomplished this by dredging would have cost about \$1,500 per acre. By this process of hydraulic grading it cost nothing.

But recurring to the experience of the Dutch engineers, in the effort made to regulate the floods by dikes, the record states: "That the rivers cannot at all times, any more than the sea, be kept under control by the dykes, is shown by the floods of 1775, 1776, 1784, 1799, 1809, 1820, 1861, etc." (*Enc. Brit.*, Holland, p. 65.)

That the creation of a free discharge near the mouth to void the floods rapidly would not injure the works of Captain Eads, as alleged, is demonstrated not only by the large crevasses which existed when his jetties were constructed, but by the Pass a Loure crevasse, which has been in existence since 1891. Moreover, streams do not deposit on a falling stage so readily as during a rising one, resulting from the reduction of velocity by obstacles placed in their paths.

The author of the paper fears, therefore, that his methods have not been thoroughly understood by his friend in far-off Java, or probably that the latter has not given due weight to the sediment problem and the need of separating it from the water of the stream wherever it may be possible by permitting the natural hydraulic motor to eject it beyond its navigable channel, instead of depositing it in its bed to obstruct both the discharge of its waters and the passage of its commerce.

For a more elaborate discussion reference is made to a paper read at the annual convention of the American Association for the Advancement of Science, at St. Louis, December 28, 1903, and published in the *Proceedings* of the American Philosophical Society of Philadelphia, 1904.

LEWIS M. HAUPT.

PHILADELPHIA, March 2, 1904.

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## Annual Reports of the Schools of Drawing, Machine Design and Naval Architecture for the Sessions of 1903-1904.

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THE DRAWING SCHOOL.—This school is an excellent indication of the condition of the engineering industries, and shows the ups and downs of the demand and supply of draughtsmen and technical workers to a remarkable extent. The last few terms have been the crest of the wave, and this spring term has shown the receding tide. Although the falling off has been slight, the indication is there, nevertheless.

But there is a compensation for this in that the best students utilize the dull times to increase their knowledge and to prepare themselves for the increased demand which is sure soon to return. Consequently, in dull times

the school is full of serious workers, bent upon making the most of their spare time, when they can combine work at school with work at home, and thus get the very most from the opportunities offered.

WM. H. THORNE,  
*Director.*

THE FOLLOWING STUDENTS HAVE DESERVED HONORABLE MENTION :

*In the Senior Mechanical Class.*

Ross Rodgers,	Chester D. Thorpe,
Walter Baylie,	William A. Janton,
J. Monroe Bowen,	Clarence N. Haven,
Walter D. Williams,	James L. Scanlin,
William Derr,	Albert F. Heeley,
George Moxley,	James P. Conway,
Herman Fink,	Philip Hochman.

*In the Intermediate Mechanical Class.*

Walter T. McGrath,	Herman Sangtineti,
E. Carman Gardiner,	Arthur Sherbourne,
James McCairns,	H. Nelson Poole,
Charles Harrison,	John Reilly,
Thomas F. Kelley,	Irene P. Pedrick,
	Charles W. Pfeiffer.

*In the Junior Mechanical Class.*

John G. Collins,	P. Saltzmann,
Merwyn McKnight,	David B. Robinson,
H. L. Schwenk,	Frank H. Shepherdson,
G. Hollinger,	Frederick Graff Groves.

*In the Architectural Class.*

William N. McCully,	Harry Stull,
Horace Tomlinson,	Charles Wilson.

*In the Free Hand Class.*

David Bowers,	Gustav D. Lemmerman.
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THE FOLLOWING STUDENTS ARE AWARDED SCHOLARSHIPS FROM THE B. H. BARTOL FUND, ENTITLING THEM TO TICKETS FOR THE NEXT TERM :

Arthur J. Beuter,	Joseph Hadik,
Charles W. Leeds, Jr.,	Charles Huegle,
J. Crankshaw,	Valentine Huegle.

THE FOLLOWING STUDENTS, HAVING ATTENDED A FULL COURSE OF FOUR TERMS, WITH SATISFACTORY RESULTS, ARE AWARDED CERTIFICATES :

Ross Rodgers,	James Taylor,
J. Monroe Bowen,	Harry Groben,
Walter D. Williams,	George Muth,
William Derr,	John H. Wackenhut,
George Moxley,	E. N. Hannum,
Herman Fink,	Robert H. Pickering,
Albert F. Heeley,	John P. Knapp,

Chester D. Thorpe,  
 William A. Janton,  
 James P. Conway,  
 James L. Scanlin,  
 Gomer W. Hagstrom,  
 Norton Fleu,  
 J. Alten Whitecar,  
 Fred. Randle,  
 Mark F. Ruhe,

Clarence Brown,  
 Edward A. Collins,  
 John Ridgway,  
 Charles Ludwig,  
 Philip Hochman,  
 Horace Tomlinson,  
 Daniel R. Finkbinder,  
 Arthur Friant,  
 William N. McCully,

H. Nelson Poole.

THE TIOGA BRANCH DRAWING-SCHOOL.—We have had a considerable increase in the number of students during the past year, and for this reason have been compelled to seek new quarters, located at Kenderton Hall, Seventeenth and Venango Streets, Tioga. This place has double the capacity of our former school, but we find that our space is already getting crowded and our present trouble is to obtain a suitable building large enough to accommodate all applicants, and at a rental within the means of the school.

We are pleased to say that this year has been the most successful in regular attendance, neatness and accuracy of work. The increased interest shown by the manufacturing concerns in this locality in recommending their young men to attend drawing-school has also been very gratifying. We also beg to offer our thanks to the George V. Cresson Company and Midvale Steel Company for the financial support extended by them, without which we would not have been able to carry on this work.

H. E. NORBOM,

*Director.*

NAMES OF GRADUATES, FRANKLIN INSTITUTE BRANCH SCHOOL,  
 SPRING TERM, 1904:

Walter Andrew,  
 Harry L. Harley,  
 Charles W. Ritzer,  
 Thomas K. Berry,  
 Thomas V. Burke,  
 John W. Duval,  
 Anders F. Forsstrand,  
 Thomas C. Haskins,

George W. Nise,  
 William Gregson,  
 Robert A. Hemphill,  
 Samuel Mason,  
 Alfred W. Hendershot,  
 Harry V. Tarbuck,  
 James B. Riley,  
 J. Aloysius Thompson,

John J. Melloy.

THE SCHOOL OF MACHINE DESIGN has just completed a successful year. Though the attendance has not been quite up to that of last year, those who did attend did so regularly, and gave evidence of being deeply interested in the work. Owing to the limited number of applicants for the courses in "Kinematics of Machinery and Machine Design," these were omitted last year, but we have good prospects of having a class in these subjects next year, and they will be taught as heretofore.

Two scholarships were awarded in the algebra class. The first, which entitles the holder to one year's tuition at the Institute, was given to the student obtaining the highest average in the examinations for the winter and spring terms. The second, which entitles the holder to one term's tuition, was given to the student having the second highest average.

We believe, from the experience of the closing season, that these rewards have a stimulating effect upon the students, and that it would prove of great benefit to the School of Machine Design if we had a fund such as that endowed by the late B. H. Bartol for the benefit of the Drawing School.

The classes in geometry and trigonometry have been under the direction of Mr. Clayton Worrall, and have been well prepared for the more advanced work next year. Mr. Yeats, a man of wide experience as a teacher, has ably assisted with the algebra.

The classes in Theoretical Mechanics and Strength of Materials have been well attended, and the students have now a good working knowledge of the design of beams, columns, shafts to withstand torsion, etc. In addition to this they have taken up the fundamental principles of graphical statics, and have drawn the stress diagrams for a number of roof trusses.

The following students have passed the examinations, their names, reading across columns, being arranged in order of merit.

L. M. ARKLEY, *Director*.

*Mechanics.*

F. E. Fisher,	M. O. Stilson,
F. B. Wetherill,	E. Schmeltzer,
C. Fithian,	Thos. Jones,
Geo. Keefe,	J. C. Warren.

*Strength of Materials.*

M. O. Stilson,	C. Fithian,
Thos. Jones,	J. C. Warren,
E. Schmeltzer,	F. B. Wetherill,
Geo. Keefe,	F. E. Fisher.

*Geometry.*

Fred. Ruch,	Wm. Fulmor,
* A. Cramp,	* E. Kirchuebel,
* L. W. Krout.	

*Trigonometry.*

Fred. Ruch,	Wm. Fulmor,
E. Kirchuebel,	A. Cramp,
L. W. Krout.	

*Algebra.*

D. Brierley,	Wm. McGonigle,
W. Magann,	F. S. Hodge,
C. Bockius,	J. Long,
S. Dougherty,	J. A. McLean,
R. Morrison,	A. Armitage,
A. Forstrand,	E. Stranahan.

D. Brierley is awarded the first scholarship ; Wm. McGonigle the second.

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\* Those marked with the asterisk obtained the same number of marks.

SCHOOL OF NAVAL ARCHITECTURE.—I have the honor to report that the School of Naval Architecture has met with decrease in its enrollment from last year, owing to the local depression in shipbuilding, but the average attendance of the senior division students during the winter term was 98·6 per cent., and for the spring term 98 per cent., the majority of this division making the full attendance; that of the junior division was 90 per cent. for the winter term and 80·6 per cent. for the spring term. Eight of the senior division have attended the full term of two years and, having passed the examinations, will be graduated.

The senior class in Practical Naval Architecture has studied the various details in construction of the different classes of vessels, making sketches and calculations for the same. In Theoretical Naval Architecture they have calculated weights of material, centers of gravity, strength of structure of the hull under varied conditions, trim, stability, etc. Their home work has shown wonderful energy, considering that the drawings, etc., are made without the usual adjuncts of a drawing office. In fact, this class has exhibited more than ordinary intelligence and its members are above the average, being neat and painstaking.

The junior students have progressed rapidly in both theoretical and practical naval architecture, and have also shown marked zeal in their work in class and at home. Numerous drawings beyond the average in neatness and accuracy have been made from blue-prints lent for that purpose.

ALEX. J. MACLEAN, *Director.*

*Philadelphia, April 22, 1904.*

#### THE FOLLOWING STUDENTS ARE AWARDED CERTIFICATES:

Charles C. Brush,	Fred. C. Griggs,
Henry A. Burkholder,	Luther W. Krout,
Robert Deichmann,	James C. Vanderslice,
Theodore H. Gloeckner,	Reginald H. Waters.

#### THE FOLLOWING STUDENTS ARE ENTITLED TO HONORABLE MENTION, HAVING ATTENDED ALL SESSIONS AND SHOWN GENERAL EFFICIENCY:

J. W. Sutton,	H. A. Burkholder,
Theo. H. Gloeckner,	C. D. Wallack,
J. C. Vanderslice,	H. C. White,
L. W. Krout,	R. Waters,
A. S. Reed, Jr.,	Lionel Levy,
Jos. McDermott,	I. Aarum,
Chas. C. Brush,	Fred. C. Griggs,
Chas. McMenamin,	Jas. B. Baker, Jr.,
C. M. Andrews,	Elmer Hicken.