

The
Maine Campus

ENGINEERING NUMBER

MAY 21, 1912



University of Maine

Vol. XIII

No. 28

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The Maine Campus

Vol. XIII

BANGOR, MAINE, MAY 21, 1912

No. 28

BOWDOIN BEATEN

Witham's Home Run Does the Trick

Another nerve racking baseball game took place on Alumni Field last Wednesday, when Maine defeated Bowdoin by a score of 5 to 4 in the tenth inning.

Maine started the scoring in the second inning.

Baker received a pass, Pickard sacrificed, Hosmer cracked out a double and McCarthy scored.

In the third inning Bowdoin rallied and a double by Joy, singles by Tilton and Brooks and a double by Means netted them four runs.

Maine got a life on Weatherell's error and Abbott completed the circuit on Stobie's single, Witham's sacrifice and another error by Weatherell.

After this inning it was a case of hanging on like bull dogs. Time after time a hit would have put the game away for either side and there was just as much possibility of Bowdoin winning as Maine.

Both Means and Stobie pulled out of some tight places during the rest of the game, and it was not until the tenth inning that another run was made. Stobie struck out, and things did not look at all promising with two strikes on Witham. Then the unexpected happened. The ball left Means hands and the next time it reached the ground it was out among the automobiles and Witham racing madly around the bases. He reached home just before the ball, thus scoring the winning run. The score:

MAINE.....	ab	r	bh	po	a	e
Gilman, 3b. W.....	5	0	0	1	2	1
Cobb, ss.....	5	0	0	1	1	0
Abbott, c.....	4	1	1	11	3	0
Stobie, p.....	5	0	2	0	3	0
Witham, 1b.....	4	1	1	8	1	1
Baker, rf.....	3	1	1	1	0	0
Pickard, 2b.....	3	0	0	4	2	0
Hosmer, lf.....	4	1	1	1	0	0
McCarthy, cf.....	4	1	0	3	0	0
Totals.....	37	6	6	30	12	2
BOWDOIN.....	ab	r	bh	po	a	e
Weatherell.....	4	0	1	3	6	3
Schofield, cf.....	5	1	0	0	0	0
Tilton, 3b.....	4	1	1	1	2	0
Lacase, rf.....	4	0	1	1	0	0

Brooks, c.....	5	1	1	11	0	1
Means, p.....	5	0	1	0	1	0
Cooley, ss.....	2	0	1	0	1	2
Russell, lf.....	3	0	0	1	0	0
Joy, 1b.....	4	1	1	11	0	1

Totals..... 36 4 7 *28 10 7
*Winning run with one out.

Maine.....	0	3	1	0	0	0	0	0	1	—5
Bowdoin.....	0	0	4	0	0	0	0	0	0	—4

Two base hits, Hosmer, Means, Joy, Home run, Witham. Stolen bases, Cobb, Abbott, Baker, McCarthy, Weatherell, 2, Lacase 3, Means, Russell. Base on balls, by Stobie 4, by Means 1. Struck out, by Stobie 11, by Means 10. Sacrifice hit Abbott, Pickard. Hit by pitched ball Weatherell, Tilton. Passed ball, Brooks Umpire, Flavin. Time, 2.28.

BATES WINS

An Interesting Game at Lewiston

Maine lost her first game in the State series, Saturday at Lewiston, Bates winning 2 to 0. Bates' first score came in the first inning on a finely executed double steal by Talbot and Ridlon, the latter reaching the home plate safely. In the seventh inning Bates made her second and final score. Cody made first and stole second, went to third on Danahy's out, Gilman to Witham, and scored on Keaney's bunt.

Both teams put up a fine exhibition of baseball, Bates playing an errorless game and Maine making three errors. The score:

BATES.....	ab	r	lb	po	a	e
Ridlon, 2b.....	4	1	2	3	4	0
Reagan, 1b.....	3	0	0	11	0	0
Talbot, cf.....	4	0	2	0	0	0
Griffin, c.....	4	0	0	9	2	0
Bates, lf.....	3	0	0	0	0	0
Cody, 3b.....	2	1	0	1	3	0
Danahy, rf.....	3	0	0	2	0	0
Keaney, ss.....	2	0	0	1	2	0
Stinson, p.....	1	0	1	0	0	0
Total.....	28	2	5	27	11	0
MAINE.....	ab	r	lb	po	a	e
Gilman, 3b.....	4	0	1	2	1	1
Cobb, ss.....	4	0	0	0	3	1

Abbott, c.....	2	0	0	8	1	0
Stobie, p.....	4	0	0	0	2	0
Witham, 1b.....	3	0	0	11	1	1
Baker, rf.....	3	0	1	1	0	0
Hosmer, lf.....	3	0	1	0	0	0
Pickard, 2b.....	3	0	0	1	2	0
McCarthy, cf.....	3	0	0	1	0	0
Total.....	29	0	3	24	10	3

INNINGS

Bates.....	1	0	0	0	0	0	1	x—2
U. of M.....	0	0	0	0	0	0	0	0—0

Two base hit, Stinson. Sacrifice hits, Reagan, Keaney, Stolen bases, Ridlon, Griffin, Cody, 3. Double play, Pickard, Witham and Abbott. First base on balls, by Stinson 2, Stobie 2. Struck out, by Stinson 10, Stobie 7. Time, 1h 35 m. Umpire, Flavin. m

COLLEGE STANDING

Maine Still Leads in the Series

As a result of the championship baseball games played last week, Maine still retains her lead in the series being played by the four colleges of the state.

	Won	Lost	Pc.
Maine.....	3	1	.750
Colby.....	1	1	.500
Bates.....	1	1	.500
Bowdoin.....	0	2	.000

ATHLETIC ELECTIONS

Board for Next Year Picked

The annual elections of the University Athletic Association which took place last Tuesday resulted as follows: President, G. G. Tilley, '13; Vice President, C. E. Chandler, '13; Secretary, W. D. Towner, '14; Senior members of the Athletic Board, E. H. Bigelow, '13, and L. E. Seekins, '13; Junior member of the Board, P. W. Monohon, '14; Manager of Track, H. P. Adams, '14; Manager of Baseball, B. B. Anthony, '14.

SOPHOMORE OWL PLEDGES

The following men were pledged to the Sophomore Owl society Thursday: Bailey, Gilman, Richardson, McDonough, Sheridan, Warren, Donahue, Freese, Thurrel, Moore, Bernheisel, Fogler, Newcomb, Baker, Burnett, Brewster.

TRACK CAPTAIN

Power the Leader for Next Year

At a meeting of the track men last Thursday, Richard A. Power, '13, was unanimously elected captain of the team for next year. He is certainly deserving of the honor as he has been a hard worker and has won many points for the University in the different meets with other colleges.

In his freshman year he took second place in the two mile at the State Meet, competed in the N. E. I. A. A. Meet, and won the two mile run in the dual meet with Vermont. Last year he won the two-mile run and took second in the mile at the dual meet with Vermont, ran under the state record for the two mile in the dual meet with Colby, and won the two mile run at the state meet. This year he won the cross country run with Tufts, broke the college record for the two mile and won the two mile run at the State Meet at Brunswick. He has certainly had an enviable career in college track and next year it is expected that he will do even better work as captain of the track team.

NEW ENGLAND MEET

Maine Won 6 1-2 Points

At the New England Intercollegiate Athletic Association Meet, held at Springfield last Saturday, the few men who represented Maine there, gave a good account of themselves. Well can Maine men feel proud of Captain Power, who easily won the two-mile. Starting with thirteen men, it was evident by the end of the first mile that the fight would be between Captain Power, Toll of Williams and Ball of Dartmouth. For the next three laps the lead was exchanged several times among these men, with Power leading on the seventh lap. Then Ball and Toll attempted to pass him but at a phenomenal pace Power broke away from them and finished with a lead of fifteen yards over Ball of Dartmouth. His time was 9 minutes, 54 2-5 seconds, 7 2-5 seconds faster than the State record.

Bailey made a creditable showing by throwing the hammer 134 feet, 1 3-4 inches. This gave him fourth place.

Rogers in the pole vault, tied for fourth place with Buck of Dartmouth.

In the one mile Towner and Houghton fought it out with Germain of M. I. T. for fourth place. However, Germain won out for fourth with Houghton and Towner following in the order named.

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INTERSCHOLASTIC MEET

Hebron an Easy Winner

The Hebron Academy track team easily won the Eleventh Annual Invitation Interscholastic Meet which was held on Alumni Field, Saturday, May 18. The trials for the field events and dashes were held in the morning but owing to the high wind no very good times were made except in the high hurdles. In this event Tewksbury of Camden won his heat in 17 4-5 seconds beating the old record of 18 seconds, but owing to the fact that he knocked down several hurdles the record does not stand.

In the afternoon the weather conditions were much better and new records were made in the mile, discus, hammer, shot, and pole vault. Roger Bell of Arlington High School showed considerable class by winning both the mile and half, but as he came from outside the state his points did not count. The half was one of the best races of the day, three men finishing in a bunch in the good time of 2 min. 7 sec. In the two mile Eddy of Orono used his head to good advantage, allowing Barton of Bangor to lead for seven laps and then beating him out in the last. Ashton of Hebron was individual champion of the meet with three firsts to his credit, Leadbetter of Bangor had eleven points, including one record, and Hutton of Hebron had two firsts, one of which was a record. On an exhibition throw Murchie of Coburn threw the 12 lb. hammer 163.45 ft.

SUMMARY

100. yard dash—Ashton, Hebron, 10 2-5 sec.; Bolton, Portland, Tarbox, Coburn.
 220 yard dash—Ashton, Hebron, 24 sec.; Donagan, Hebron, Small, Hebron.
 440 yard dash—Fuller, Hebron, 54 sec.; Totman, Oak, Grove; Ranger, M. C. I.
 880 yard run—Crosby, Dexter, 2 min., 7 1-5 sec.; Saywood, Deering; Hardy, Bangor.
 Mile Run—Preti, Portland, (Record) 4 min. 45 sec.; Mosher, Dexter; Brackett, Good Will.
 Two mile run—Eddy, Orono, 10 min. 52 sec.; Barton, Bangor; Carson, M. C. I.
 120 yard hurdles—Thompson, Hebron, 18 sec.; Tewksbury, Camden; Hewey, Lewiston.
 220 yard hurdles—Gonagan, Hebron, 27 4-5 sec.; Tewksbury, Camden; Stillman, Thornton.
 High jump—Ashton, Hebron, 5 ft. 2½ in.; Ladd, Dexter, Barker, Thornton, tied.
 Broad jump—Hutton, Hebron, 20 ft., 2 in.; Murchie, Coburn, McCobb, Camden.
 Pole vault—Hutton, Hebron (record) 10 ft. 9 in.; Dow, Foxcroft, Harris, Dexter, tied.

12 lb. shot—Allen, Hebron, (record) 43.71 ft.; Leadbetter, Bangor; Fuller, Hebron.

12 lb. hammer—Corbett, (record) 137.5 ft.; Leadbetter, Bangor; Mrurchie, Coburn.

Discus—Leadbetter, Bangor, (record) 105.1 ft.; Fuller, Hebron, Murchie, Coburn.

SUMMARY OF POINTS

Hebron Academy.....	58
Bangor High.....	15
Dexter High.....	12
Portland High.....	8
Camden High.....	7
Coburn Classical Institute.....	6
Orono High School.....	5
Oak Grove Seminary.....	3
Thornton Academy.....	3
Deering High.....	3
M. C. I.....	2
Foxcroft Academy.....	2
Lewiston High.....	1
Good Will High.....	1

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U. OF M. INTERSCHOLASTIC SPEAKING CONTEST

Twenty-Two Schools Represented

After about an hour's discussion of the merits of the speakers last Friday night the judges awarded the prizes in the Interscholastic Speaking Contest. The contest was close and those present were entertained with a variety of selections from the gay and humorous to the sad and pathetic. To simply say that the contestants did well would be putting it far too mildly for each with his or her own personality showed a lot of study and preparation.

The first place was taken by Miss Hazel T. Towle of East Maine Conference Seminary. The title of her reading was "Her First Recital." The second place was taken by Donald Record of Livermore Falls High School. His speech was a selection from Les Miserables, "Jean Val Jean and the Bishop." The third place was taken by Ralph Goodrich of Hebron Academy. His selection of "The Wild Olive Wreath," dealt with the scene at one of the Olympic games."

Twenty-two schools were represented in the contest and the speeches were very interesting. The prize winners were exceptionally good. Prizes of twenty, ten, and five dollars were awarded by the judges. Judge C. J. Dunn, Rev. A. J. Torsloff, and V. A. Ketcham.

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BANGOR CO-OPERATIVE PRINTING COMPANY

EDITORIAL.

This issue of the CAMPUS is a much enlarged Engineering number which, it is hoped, will prove of special interest to the Engineering alumni. Both the longer articles and the personal notes are so planned as to indicate, in a general way, the progress and present activities and work of the college and the alumni. One thousand extra copies of the issue will be printed and sent to alumni of the College of Technology, and it is hoped that renewed interest will result among our graduate engineers.

There has been formed this year in the College of Technology a Publicity Committee whose purpose is to bring about a better distribution of all news pertaining to the activity of that College and its various departments. It has been felt

for some time that there is need of some regular publication especially devoted to keeping the alumni informed of all these activities in the Technology department. Other technical colleges, some of them much smaller than the University of Maine, have such a publication, some issued as quarterlies, others annually. It seems reasonable to suppose that our engineering alumni now number enough to support some such paper, perhaps an annual which would be devoted to the interests of the College of Technology and engineer alumni of Maine. Whether or not such an annual can be attempted will depend in large measure upon the reception which is given to this Engineering Number of THE CAMPUS. The Publicity Committee of the College of Technology would be very glad to receive suggestions or criticisms concerning the establishment of such a paper which if well supported would aid materially in building up our technical departments.

The track season is over for this year and our baseball team has completed its home schedule—in fact from now until the Seniors in "Finals" their caps and gowns shall receive that for which they have worked for years there seems to be little that the entire student body can support. But there is something that is pretty generally shared in by all the students and something that will for a time at least call out their latent and perhaps dormant energies—"finals."

With summer coming along so rapidly; with the afternoons and evenings growing more pleasant every day, there is a tendency to spend much time out-of-doors. This is all well, but there is that task, heavy for some, that must be accomplished before we leave this happy year behind us. There is a class of students in every institution of learning, and it is not, unfortunately, entirely lacking here at Maine that feels satisfied with a low passing mark or even with an F. Such a sentiment is entirely wrong for is not the real purpose of our college course to get what we can out of our work? The outside college life is an absolute essential to the best development of a young man; but the first essential is that he

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shall accomplish his scholastic work well. A word this week seems too early for some and a word next week would be too late, but after the "finals" are over let there be fewer "F's" and the result will be more satisfactory on all sides.

"No formal invitations to the Commencement exercises of 1912 will be issued. This year we celebrate important anniversaries. **Alumni** A large attendance of alumni and **Attention** friends is desired. Every one interested in the University is urged to be present."

The above words signed by President Robert J. Aley of the University, are self-explanatory. They appear on the cover of the 1912 Commencement bulletin and have doubtless been read by large numbers of our alumni. But a mere reading is not enough; action ought to follow. It is an interesting fact that the cup which has been offered the class that has the largest percentage of living alumni back to Commencement has thus far been won by classes way back in the seventies. Of course they can have a smaller number present and win, but yet it seems that some of the other classes should make a united effort to come back this year and visit their Alma Mater at its Commencement.

GIFT TO LIBRARY

Confederate Notes Presented

Prof. Ralph K. Jones, librarian of the University, has recently received a letter from the Assistant Secretary of the U. S. Treasury asking if the library will make such disposition of an assortment of Confederate notes that they may be of permanent value to students of the University. A considerable stock of these notes, which came into the possession of the Union Army about the close of the war, was turned over by the War Department to the treasury in 1867, and it is from this stock that assortments are being sent out. The assortment offered does not comprise all the series of notes issued but contains specimens of such as are in the possession of the Treasury Department. The collection is expected to arrive soon and will be put on exhibition.

FINAL DEBATE

Bangor High the Winner

Last Saturday evening in the Chapel the Bangor High debating team won over Foxcroft Academy in the final debate of the Interscholastic League. The question was "Resolved, that reciprocity with Canada would be for the best interest of the U. S. (Argument limited to the bill of 1911)" The winning team upheld the affirmative. The arguments throughout were interesting and clashed well but Bangor High did a little better work in refutation.

Both teams showed excellent preparation and either was deserving of the handsome cup awarded by the University to the winning team. Frank W. Lorimer of Bangor was awarded the thirty dollar scholarship for excellence in speaking. A very small crowd was present.

The order of speakers was as follows:

Affirmative: Charles Piston, Edward Garland, Frank Lorimer.

Negative: Ora L. Evans, Brooks Brown, Hugh Hescok.

The coaches G. C. Clarke, '13, for Bangor High and H. R. Clark '14, did efficient work for the teams.

THE AMERICAN CHEMICAL SOCIETY

Organization of Maine Section

On Thursday afternoon, May 16th, a number of members of the American Chemical Society met in the Chemical Laboratory of the University and organized a local section of the Society to be known as the Maine Section of the American Chemical Society, and to comprise in its membership those members of this Society residing in the state. The total number of charter members of the section is forty-four and of these twenty-seven were present. At the scientific meeting in the afternoon the following papers were presented, and followed by general discussion:

"Practical Observations upon the Operation of Commercial Electrolysis of Brine."—Mr. A. B. Larchar.

"An Oil from the Red Spruce."—Mr. R. H. McKee.

"Some New Laboratory Apparatus,"—Mr. L. M. Burghart.

Following this a dinner, prepared under the direction of Mr. Schimmel and served by the student members of the society, was enjoyed.

At the business meeting in the evening, the following officers were elected to serve as executive

committee and complete the organization: President, Mr. Larcher of Great Works; Secretary-Treasurer, Mr. H. H. Hanson, Orono; Councilor, Mr. R. H. McKee, Orono.

Hitherto the chemists of Maine have been grouped with the northeastern section with headquarters at Boston and very few have been able to avail themselves of the privileges of the section meetings. The organization of a Maine Section will give state chemists a much more satisfactory opportunity of getting together and the section promises to be a prosperous one.

LAW NOTES

Professor Jackson, a graduate of Columbia University, and one of the foremost insurance experts in the country, lectured before the students of the Law School and the insurance men of Bangor, Monday.

A meeting of the Athletic Association of the Law School was held Friday morning for the purpose of electing officers for the ensuing year. The officers elect are as follows: President, E. F. Corliss, Jr., Cumberland, Me.; Vice President, M. V. Doten, Bangor, Me.; Secretary, C. B. Adams, Randolph, Vt.; Treasurer, C. A. Weick, Springfield, Me.; Executive Committee, A. J. Beck, Deer Isle, Me., C. A. Bove, Portland, Me., F. W. Small, Steep Falls, Me.; Manager Baseball, E. B. Turner, Augusta, Me.

The Law School baseball team defeated the Orono Athletic Association team, Saturday at Orono. This was the fourth victory of the Law School team.

A picture of Judge Thornton L. Massie of Pulaski, Va., the judge who was assassinated while presiding over his court at Hillsville, has been received at the Law School, and will be hung in a suitable place. The picture was a gift of Mrs. Massie. Below the photograph are the words: "Rather than indicate a fear of law breakers by sitting on the bench with a weapon in my pocket, I prefer to be killed in the administration of justice." These lines are followed by a statement from Mrs. Massie, that these words were spoken by her husband the night before his brutal assassination, when urged by a friend to protect himself.

There is considerable rivalry between the Democratic and Republican Clubs at Bowdoin college and both are arranging for a series of speeches on political questions.

REPORT OF CLASS OF 1912

Special Prism Report

RECEIPTS

By advertisements.....	\$184 94	
By sale of Prisms.....	621 25	
By class treasurer.....	3 50	
		\$809 69

DISBURSEMENTS

Chas. H. Elliott & Co.....	\$25 00	
Elec. City Engraving Co.....	150 00	
Bangor Co-Op. Printing Co.....	515 00	
Alden Chase, expenses.....	35 00	
W. R. Witham, expenses.....	7 80	
Sundries.....	13 12	
		\$745 92

Cash on hand.....	\$83 77
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BILLS STILL UNPAID

Elec. City Engraving Co.....	\$ 713 02	
Bangor Co-Op. Printing Co.....	1,374 25	
Alden Chase, expenses.....	85 64	
Chalmer's Studio.....	48 15	
Chas. H. Elliott & Co.....	25 00	
W. R. Witham.....	7 81	
Sundries.....	13 12	
		\$2,299 98

Assets.....	\$809 69
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Deficit.....	\$1,490 29
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CLASS REPORT INDEPENDENT OF PRISM ACCOUNTS

RECEIPTS

Bal. at last report.....		
Received from class dues.....	\$122 00	
Received from Senior assembly...	68 35	
Received from W. R. Ballou, (Jun. Wk. progs.).....	18 10	
		\$208 45

EXPENDITURES

W. R. Ballou—on note.....	\$71 73	
Bangor Co-Op. Print. Co.....	21 00	
Geo. Rowe, orchestra services.....	4 00	
Incidentals.....	1 12	
		\$97 85

Balance.....	\$110 60
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ASSETS

Class dues from last year still unpaid	\$105 00
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LIABILITIES

Bills owed but not yet paid.....	\$56 50
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WILLIAM GRAY, Treasurer, 1912.

May 10, 1912.

TECHNOLOGY NOTES

At the University of Maine Summer Term, work will be given in courses in two departments of the College of Technology: Chemistry and Mechanical Engineering. Additional information regarding these courses may be had by sending to the Secretary of the University for a Summer Term Bulletin.

Dean H. S. Boardman of the College of Technology, University of Maine, lectured recently in Milo on the subject "Irrigation in the West." The lecture was under the auspices of the Men's Federation of Milo, and was illustrated by about 100 lantern slides showing views of the location and construction of the irrigation works in Montana and Wyoming.

FRATERNITY NOTES

Delta Tau Delta Entertains

Gamma Nu Chapter of Delta Tau Delta held an informal dance at the chapter house last Saturday evening.

THETA EPSILON DANCE

The Theta Epsilon Fraternity held a most enjoyable dance on Friday, evening May 17.

PHI ETA KAPPA PARTY

The Phi Eta Kappa Fraternity entertained at its Chapter house last Friday evening.

BETA THETA PI RECEPTION

Beta Eta Chapter of Beta Theta Pi held their annual reception and dance at the Chapter house last Friday evening. The house was decorated with evergreen and roses and Pullen's Orchestra furnished music. In the receiving line were: Dr. and Mrs. M. C. Fernald, Mr. and Mrs. Alden Webster, and E. W. McKeen. George H. Nichols was present as delegate from Beta Sigma Chapter of Bowdoin. Mrs. Laura Hamlin of Orono was patroness.

THE UNIVERSITY OF MAINE EMPLOYMENT BUREAU

By Dean H. S. Boardman

Our University, located as it is, in the extreme north eastern part of the United States, and far from any of the large business centres, is seriously handicapped in many ways. One of the difficulties with which it has to contend is the placing of its technical men in close contact with examples

of engineering practice. This is overcome in part by trips of inspection, illustrated lectures by our own engineers, and occasional lectures by engineers from away.

Another difficulty is that experienced by men of our graduating classes who can not without much loss of time and considerable expense, come in personal contact with possible employers. Many positions are obtained for them but it is believed that much benefit comes from the graduate obtaining his own position, the assistance of his instructors being given in recommendations and in calling his attention to possible openings. It is, however, important to have knowledge of such openings, and to establish a feeling of confidence with employers, so that there will be a call for Maine men. We have many such calls and the feeling is growing that our graduates develop into good material. We need all the cooperation possible in this effort and one of the movements which promises to be of much assistance is that of the New York Alumni in the formation of the University of Maine Employment Bureau.

The alumni of the College of Technology should have received by this time circular letters explaining the scheme. For the benefit of those who have not had knowledge concerning it a short statement will not be out of place.

The Bureau is to be made up of branches in a number of the larger cities with headquarters at Orono. Each branch is composed of a committee of the alumni having one member for each course which is represented. At present this includes Chemistry, Civil, Electrical and Mechanical Engineering. The University furnishes each branch with data concerning each alumnus and this includes his record as an undergraduate and also during his professional career. It is expected to apply this scheme to other departments of the University and that it will bring the institution into closer touch with both employers and alumni.

"THE LION"

By Prof. C. B. Brown

All alumni who have been upon the Campus at any time during the past seven years, either as graduates or as undergraduates will probably remember the old locomotive "LION" which has stood on the Campus during that time.

The University is very fortunate in having in its possession such a relic of the early days of railroading; and all its alumni are undoubtedly extremely grateful to the men through whose

efforts this locomotive now stands in our embryo Engineering Museum.

This locomotive, together with its mate "TIGER," was built by Hinkley & Drury of Boston for the Whitneyville & Machiasport Railroad, a logging railroad of eastern Maine. The date of its construction is somewhat uncertain. The best authority on most points regarding this locomotive gives the date as 1839. But this same authority states that it began running on the above named road in 1845. This latter date gives weight to the statement of another authority who gives the date of its construction as 1844.

The LION was one of the very first locomotives used in Maine. In fact, it is quite possible that its mate TIGER, which probably preceded it by about a year, was the very first.

The entire life of the LION as a locomotive was spent on the road for which it was built. It ceased active service when that road was abandoned in 1890. For almost exactly one-half of this period,—that is, from 1848 to 1870,—this engine had but one driver, Cornelius Sullivan of Waterville.

In 1898 both the LION and the TIGER together with other old iron, were sold for junk to Thomas Towle of Portland. The LION was saved from such an ignominious end by Hon. Edgar E. Rounds and others of Portland.

After about five years' residence in Portland a movement was started to have this locomotive presented to the University of Maine. In January, 1905, through the efforts of Mr. George H. Smardon, Hon. Edgar E. Rounds, both of Portland, Hon. James P. Baxter, then Mayor of Portland, and Dr. George Emory Fellows, at that time President of the University, this endeavor became an accomplished fact. The alumni of the University attended to transporting the LION to the railroad, and the Maine Central Railroad carried it free of charge to Webster.

During the last two or three years it has been well housed in as suitable a building as the University can yet afford; and it invites inspection by all visitors to the University Campus.

NOTES ON THE MAINE SARDINE INDUSTRY

In December, 1910, the United States food inspectors seized several thousand dollars worth of domestic sardines at Pittsburg and other storage points, claiming that the goods were unfit for human food. This move on the part of the government so alarmed the Maine packers that

that they asked the director of the state experiment station to make an investigation of the industry with a view to improving the quality of the goods, and forwarded the necessary funds for carrying on the work.

There was little literature to be found on the subject and that little was largely in the reports of the Fish Commission dealing more with the fish than the manner in which they were processed or packed. The information gained from the packers was varied and conflicting to say the least so it was at once apparent that first hand information was necessary. Accordingly the writer was asked to carry out the investigation and was stationed at Eastport for the summer with directions to "find out all he could about the Sardine Industry."

It soon appeared that there were several factors which tended to lower the quality of the domestic sardine. Chief among these were first the tendency of the fish under some conditions to break along the ventral side, commonly called "belly-bursting," and the second, the tendency to break up or "chowder" after they are put in the cans. Many packers were inclined to assign these troubles to the so called "red feed" which the fish eat in great abundance, claiming that "feedy fish," i. e. fish with food in their poke, were not only sure to break and chowder but were unfit for food. Others asserted that they had eaten feed fish all their lives and felt no ill effects.

The problems before us were then: 1st What is "red feed?" 2nd Are feed fish fit for food? 3rd What are the causes of belly-bursting, breaking and chowdering? And having found the causes of the troubles, 4th How may they be removed or counteracted?

Before proceeding to the solution of these problems a brief outline of the industry may be in order.

The fish which are put on the market as American Sardines are small herring, *Clupea Herrengus*, first cousins to the pilchard, *Clupea Pichardus*, the French Sardine. They are caught in traps or weirs, scooped into the hold of small schooners where they are salted, a sack of salt to the hogshead, and carried to the factory. At the wharf they are scooped into tubs with a scoop shovel, hoisted and dumped into a sluice which carries them to the pickle tanks. These are of wood, holding about three hogsheads and are filled about one-third full with a 90-95% saturated salt solution. The strength of the solution should be maintained by adding salt from time to time to replace that taken up by the fish. The object of pickling is to flavor and toughen the fish, the operation requiring two to three hours.

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Lean fish take the pickle much more quickly than do fat fish and require less time.

After pickling the fish are flaked, that is, layed in parallel rows on wire trays. This is usually done by a flaking machine, which unless carefully operated is likely to tear and cut up the fish.

The trays are next placed in racks in steam boxes where the fish are cooked with live steam for from eight to fifteen minutes, depending on their size and condition.

The drying of the fish is accomplished either in a large brick oven where the time required is from fifteen to thirty minutes, or by means of warm dry air from a fan or blower, requiring two or three hours.

The dried fish are distributed to the packing tables where they are beheaded with shears and packed in 4 oz. tin boxes. Oil is added to the cans and the covers sealed on by a sealing machine. The larger fish are usually packed in mustard sauce in 11 oz. cans.

The sealed cans are dumped into a steel tank filled with boiling water where they are "bathed," to sterilize the package and to soften the bone. The temperature of the bath is 214° at the bottom and 212° at the top and is maintained by a perforated steam coil at the bottom of the tank through which steam is forced under pressure. The length of time of bathing varies considerably with the different factories, usually one and a half to two hours for 4 oz. cans and one and a half to three or three and a half hours for 11 oz. cans. At the end of the period the cans are scooped out of the bath, dried with sawdust and sent down a shoot to the shipping room where they are cooled, inspected, and packed in cases for shipment.

Now to return to the problems mentioned above. A sample of red feed was obtained from the belly of a herring and though partially digested it appeared under the microscope to be a mass of small crustacean, the individuals being about a millimeter in length. The Station biologist verified this conclusion and added the information that it was a Copopod, *Temora Longicornis*. The red color is due to globules of a red oil found in the body of the organism. Red feed and small shrimp constitute the natural food of the herring and the writer was unable to find any evidence that feedy fish were in any way unfit for food.

After considerable observation in different factories the writer came to the conclusion that the following conditions and practices were the chief causes of breaking, chowdering and belly-bursting.

1. Rough handling will break anything and herring are no exception to the rule. In fact, the

manner in which the fish are caught, scooped, sluiced and flaked is such that only a pretty solid herring could go through the process and maintain its identity as a fish.

2. Over-salted fish, after steaming and drying, tend to break transversely leaving a gaping slit across one side or the other.

3. Warm water fish, i. e. fish from shallow bays or mud flats, will naturally not be as firm as fish from deep cold waters.

4. Fish too long out of water without sufficient salt begin to soften and decompose, and should be sent to the fertilizer plant.

5. Very fat fish are, of course, tender and should be carefully handled. They do not absorb the salt readily and are dried with difficulty, so that extra time should be allowed for the pickling and drying of fat fish. The characteristic break of a fat fish is lengthwise along the backbone where the fat is deposited and the skin is tender.

6. "Feedy fish," i. e., fish with undigested food in their bellies when taken, often very rapidly even when put immediately into strong pickle. The characteristic break of feedy fish is along the belly where the flesh is thinnest, and the breaks begin to appear about 3 hours after the fish are out of water. Handling greatly increases the tendency to break but it will occur even while the fish are lying in pickle in the boat. The cause of the softening seems to be auto-digestion, since the flesh of the entire body softens, belly breaking being characteristic only because there the flesh is thinnest and gives way first. Such fish give no evidence either by odor or taste of decomposition or decay.

It is evident that care in handling and processing would prevent a large part of the loss from broken fish but the remedy for belly-bursting of feedy fish is not so easy to find. Beheading and eviscerating as soon as possible after the fish are taken from the water prevents belly-breaking to some extent but keeping the fish in pounds until they have digested their food is the only sure way to prevent loss from this source.

The wide variation in bathing practice suggested a series of tests to determine how long it took the heat to penetrate to the center of the package, since at the end of that period sterilization would have been effected.

Several cans were taken and a registering thermometer placed as nearly as possible in the center of each. The cans were sealed and placed in the boiling bath for different lengths of time. At the end of ten, fifteen, twenty minutes, etc., cans were taken out and the time and temperature recorded. From the data obtained it was found to take 25 to 30 minutes for a 4 oz. can and 60

minutes for an 11 oz. can to come to bath temperature. There must then be considerable waste of steam when the cans are bathed two or three hours.

Several other interesting problems presented themselves to which time did not allow even an attempted solution. Among these were; the question of high versus low pressure steam in the steam boxes, the efficiency of different types of driers and a more complete explanation of the cause of belly-bursting.

NOTES ON THE USE OF ELECTRICITY IN BITUMINOUS COAL MINES

By H. H. Clark, 1899

This article will be somewhat disappointing to the reader who expects to be told of some novel applications of electric power. The purposes for which electricity is used in a coal mine are quite commonplace and much the same as those for which electric power is employed in a large manufacturing plant. The peculiar features of the system are the conditions and environment under which the power is used underground. As my space is limited I will confine my remarks to the part of the equipment that is most closely related to the underground work.

A coal mine may be considered as a series of chambers excavated from a bed of coal and connected by passageways, known as butt or cross entries, to two or more main passageways that lead to the foot of a shaft or a slope or directly to the outside of the mine.

The last mentioned passage is called a drift opening. Generally speaking the operation of a coal mine consists in excavating the passages in the coal (driving entries and rooms) and hauling the coal to the surface. This theory sounds absurdly simple but its practical application involves the solution of some difficult and puzzling problems.

Starting at the mine entrance or "pit mouth," provision must be made for bringing the coal to the surface. In a shaft or a slope mine this is accomplished by a hoist. In a drift mine the coal can be hauled from the "face" (the point in the vein at which the coal is cut from the solid) to the surface at one operation. In advancing the entries the coal must be "undercut" by hand or machine and then shot down (blasted). It must then be hauled to the foot of the shaft or slope or directly to the surface (in a drift mine.) Incidentally the entries and rooms must be ventilated by air from the outside, more or less water must be removed from the mine, a certain

amount of lighting (other than that afforded by the miners' lamps) is usually provided, and a more or less complete system of signals must be installed.

There was, of course, a time when electricity was not used in connection with any of the operations just mentioned and even at present the older methods prevail altogether in some mines and to some extent in others. The majority of hoists and ventilating fans are driven by steam engines although many are operated by electric motors. If, as is usually the case, the hoist and the fan are located close together and not far from the power plant and if the mine is not operated from an electric sub station it is simpler and more economical to operate both fan and hoist by steam than to provide additional engine and generator capacity in the power house in order to drive the fan and hoist by motors. Then too, operators have been very conservative about adopting electric power to drive fans and hoists because possible interruptions of service were feared. An interruption in the operation of the main ventilating fan usually requires the immediate withdrawal of all men from the mine. If the hoist of a shaft mine should fail in an emergency, loss of life might result. If both fan and hoist failed at the same time it might be disastrous.

Coal is still occasionally undercut by hand or by compressed air and shots are still set off by fuse although electricity has been used for both purposes for years. Mine haulage is also in many cases operated by other than electric means either because grades are too steep for locomotives or because the mine is so gaseous that the flashes from the trolley wire would be dangerous. It will not be many years however, before electric power will be used in coal mines for all purposes to which it can be safely and efficiently applied.

The underground apparatus consists mainly of electric locomotives, hoists for inclines (where the coal "dips" as they say, or presents too heavy grades for locomotives,) pumps, coal cutting machines, lights and signals.

The locomotives operate at 250 or 550 volts on the trolley system, the rail being used as the return circuit. The trolley wire is strung well to one side of the entry (usually several inches outside the rail) in order to safeguard the passersby. In many cases the entries are not more than 6 feet high, sometimes less than that, and a 500 volt trolley wire is not a comfortable thing to have near one's head in a dimly lighted passage with a very uneven floor, especially when rapid movement is occasionally required in dodging passing cars.

Mules, which in some mines are used for "gathering," (drawing the loaded cars from the

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rooms to the electric haulage track) are very sensitive to electric shock and in low entries their long ears are a source of annoyance; to the mules for obvious reasons and to the mine owner because a good mule costs over \$200.00.

Whenever the underground grades are too steep for locomotives the coal cars must be moved by rope haulage, this requires the usual equipment of a hoist. These hoists are often operated by electricity although sometimes by compressed air.

Pump motors are usually not large (under 50 h. p.) although in some mines all the water is made to drain to a single pump pit or sump at which point one or more large units will be installed. Sometimes the motors of such a pumping station aggregate 1000 h. p. in capacity and in such cases they are usually alternating current machines. A station of this size would be installed in a well lighted chamber of considerable size lined with brick or concrete. Even smaller pumps are equally well installed. Often, however, small pumps will be found permanently installed in rooms cut from the coal with little or no reinforcing on sides, roof, or floor.

Coal cutting machines are used for "undercutting" the coal before it is shot (blasted) down. Undercutting consists in removing from beneath the block of coal to be blasted out, a layer of coal about 5 inches thick, 6 feet deep and the full width of the entry or room that is being worked. The undercut is made so that more coal can be loosened per pound of explosive, so that the coal will not be broken into such small lumps as would be the case if the coal was "shot from the solid," and so that there will be less danger of blown out shots. There are various types of coal cutting machines but the function of all is the same. The "chain" breast machine is a good one to describe briefly. As its name implies the feature of this machine is an endless chain carrying cutting teeth and mounted around the edges of a rectangular frame so arranged that it can be fed underneath the coal as the cutting proceeds. These machines are operated by direct current, compound wound motors of about 25 h. p. capacity. The motors are mounted upon the frame of the cutting machine and operate the chain through a gear connection. Power is taken to the motor through a flexible duplex cable, one conductor of which is connected to the rail or to a ground wire and the other to the trolley wire or to a separate feeder installed especially for machine service.

Electricity is used in some mines for igniting the charges of explosives that are used to blast down the coal. Electricity for this purpose may be obtained from dry cells, storage cells, magnetic be obtained from dry cells, storage cells, magneto

generators or power circuits. In some mines elaborate systems for firing shots electrically have been installed. In such systems special circuits and even special generators are used and no shots are fired until all the men have been checked out of the mine.

All systems of low voltage electric shot firing use a detonator that consists of a short piece of very fine platinum wire surrounded by gun cotton or its equivalent and enclosed in a small copper tube with a little mercury fulminate. Double cotton covered leads are brought out of the tube for connecting the platinum wire into the electric circuit. When the detonator is connected to a source of potential, the platinum wire grows white hot and burns off almost instantly thus igniting the gun cotton and mercury fulminate which in turn detonates the explosive in which the detonator may be imbedded.

Mines are not brilliantly lighted as a rule but there is a great deal of difference in the practice of different mines in this respect. The "bottom" (the part of the main haulage entry at the foot of the shaft or slope) is usually the best lighted place in the mine although there are sometimes a few lights at the junctions of the main entry with side entries upon which locomotives are operating.

Standard carbon filament incandescent lamps are used for mine lighting. The lamps are usually connected between the trolley wire and the track rail and in 600 volt systems several lamps must be connected in series.

Electricity is used to some extent for signalling. Some mines have a system of electric signals that would do credit to a four track railroad. Such installations are not common, however, and are used mainly about the shaft bottom for handling the rips of cars as they come up from the face. The most common form of electric signals consists of an electric gong operated by 10 or 15 cells of battery. The gong and battery are located in the hoist house and two uninsulated wires run down the slope to all the points from which it is desired to send signals to the hoisting engineer. Signals are sent by pulling the wires together until they touch or by making the connection with a file, pick, drill, or any piece of metal. The simplest form of signal that I ever heard of was not operated by electricity. It was (and still is I believe) installed in a slope mine where the bottom was over a mile distant from the hoist house. The signal consisted of a bell located in the hoist house and a single wire attached to the bell and leading down the slope to the bottom or parting 7000 feet away. Signals between the parting and the hoist house were sent by pulling the wire until the bell rang.

Telephones are used in many mines and their use is increasing. The telephone instruments are designed especially for underground service and are enclosed in iron boxes designed to be moisture proof.

Just a word about the underground distribution system. Power is taken below ground through shafts, bore holes and along the sides of entries. Alternating current is usually carried underground by insulated 3-conductor cables, lead sheathed and sometimes armored with steel wire. The positive wire of direct current systems is insulated in shafts and bore holes and occasionally in other places but much of its length is left bare. As the negative side of direct current systems is usually grounded, little attention is paid to its insulation and it is usually carried into the mine no farther than the point where the bonded rail system begins. The positive wire often goes in as the trolley wire in small mines with perhaps an additional feeder for the cutting machine circuit. Pump motors usually take their power from the machine circuit if there is one, if not, the pump motors are connected between the trolley wire and the track rail. Wherever the bonded track rail network extends only a positive wire is carried, but beyond such points a return wire must be taken also. These wires are not usually covered with insulation but are strung on glass or porcelain insulators along the sides of the entries and protected by a board. The miners call the ungrounded side of the circuit the "hot" wire and the grounded side the "cold" wire.

DEPARTMENT OF CIVIL ENGINEERING

By Dean H. S. Boardman, 1895

Years ago a civil engineer implied a man whose chief occupation was to go about the country with a compass or transit on his shoulder, running lines, or else forcing some railroad route through a section of the country where the Indians or the topographical features of nature contested every step of his progress, only finally to give way to his irrepressible will and energy. Later the term civil engineer stood for a mathematical expert who, scorning the use of a thing so simple as arithmetic when it could be avoided, was supposed to grind out by higher mathematics the engineering problems of the day. And in a measure these popular conceptions were not always far from the truth. Now, however, all this is changed. It is true that the surveyor and railroad here still exist, and that mathematics is still the foundation of the principles of engineering, but with the development of the country

and the advent of modern civilization, the much hackneyed definition of Wellington, that an engineer is a man who can perform "that well with one dollar which any bungler can do with two after a fashion," was never more strongly exemplified than at the present time, and the real engineer has become very much of an economist.

Consequent with the development of engineering many changes have been brought about in engineering education, and whereas formerly the engineering student was taught very little outside of mathematics and subjects directly related to technical subjects, now the tendency is to give as liberal an education as is possible, with especial attention to English, economics, and business law. Instead of trying to turn out a highly specialized, overtrained graduate who usually has an exaggerated opinion of his importance, institutions of the better class are developing men who can think for themselves and who realize that, upon graduation, they are not engineers, and that in order to become such, they must begin at the foot of the ladder of experience and develop judgment and the art of intercourse with mankind. There is, however, a period of adjustment in the life of the young man directly after graduation, consequent to the change from college life to the life where he must depend upon himself. This is a critical time in his career, for he is usually an actual expense to his employer, and he is likely to feel such a reaction that he becomes disgusted with his own efforts. Notwithstanding the fact that he has been told of this period, he feels that his employers do not appreciate him or help him. This is the period during which the many criticisms of the college man are heard. How many times do we hear the expression, "Smith will be quite a man when he forgets what he learned in college" Employers should, however, realize that they probably passed through such a period of adjustment themselves and not judge the young man too harshly, for it is not that he must forget what he has learned, it is that he must learn how to use his knowledge, and, in order to do himself and his employer justice, he needs help. If the technical college graduate is worth while—if he is a business proposition, which is denied by only a very small minority, then the employer should help him past this point in his career over which the college has no control.

The question of the best curriculum for our technological institutions is open to much discussion, and although formerly it depended in a large degree upon the whims and ideas of the particular man in charge of the course, now more general schedules are adopted so far as the resources of the particular institution will allow.

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The Society for the Promotion of Engineering Education has done much to secure a uniform method of education. This society is composed of both educators and purely professional men and many valuable discussions have been conducted by the society which have resulted in the solution of important educational questions. It is realized that much remains to be done and that technological education is far from perfect, but we are certainly progressing.

Engineering departments usually lack money for carrying on their work and our department of Civil Engineering is no exception to this rule. We lack funds to develop many things, but we are endeavoring to do the best we can with our resources and much of the lack is made up in extra effort. Only a few years ago the head of the department was the only permanent teacher, as, owing to lack of money, we could not offer sufficient inducement to hold others for more than a short period. This meant constantly changing instructors, and a resulting unsteadiness in the work. Only a few courses could be developed to a high degree of efficiency, and even these suffered at times. During the past few years a change has taken place, and now at least three positions in the department are permanent, with the expectation of a further increase. This has resulted in more stable courses and a higher degree of efficiency for the entire department. The University encourages the technological teaching force in a certain amount of outside practical work and desires them to be in touch with State interests. A number are engaged in private work and also in helping to further many of the efforts of national and state conservation.

The students are earnest workers, and their teachers strive to bring out their sense of responsibility, and to prepare them to meet the problems of life, by personal contact as well as by acting as their instructors in their scheduled work. The alumni can aid materially in this in many ways, and the head of the department is always pleased to hear from them and asks for their criticism and advice. It must be remembered, however, that such can not always be followed, but even then it all helps. When we take time to consider, is it not strange how one's point of view changes from time to time? How differently we look at things in general after the lapse of even one year from the time of receiving our degree!

Our graduates are scattered all over the country. It is difficult for the department to keep in touch with them all, but efforts are to be made, and in fact this issue of the CAMPUS is one of them, to establish a closer bond with the alumni.

It will be remembered by the graduates of the past ten or twelve years that a collection of data was made about two years ago. This is being supplanted by a more complete effort, which it is expected will result in information of much value which will be published in an entirely impersonal way. In the meantime the following will be of interest as showing the results of the former effort.

The period from which the results were obtained covers the years from 1895 to 1910, inclusive. A very large percentage of Civil Engineering graduates replied to all the questions asked, and there is every reason to believe that the information given was authentic.

Of the total number, about 85% are engaged in engineering work, leaving 15% who are following mercantile pursuits. Less than 1% of this number express themselves as dissatisfied with the engineering profession. The work in which the men are engaged may be classified under the following heads: Reclamation Service, Hydraulic Structural, Railroad, Municipal and Highway Engineering, Teaching and General Contracting.

The records show that 13% are engaged in Reclamation work. They report an average earning capacity of about \$1850 per annum, with a maximum of \$4200.

Hydraulic work claims 10%, drawing an average yearly salary of \$1825 with a maximum of \$3350.

Structural work which includes concrete workers has the greatest number of followers. There are about 23% in this branch drawing an average yearly salary of \$1980 with a maximum of \$7200.

Railroad work ranks next to structural in numbers, drawing about 21%. The average yearly salary for this class is under \$1200, the maximum being about \$2400.

7% have answered the call as teachers with an average salary of \$1450 per annum with a maximum close to \$3000.

Contracting and business that may be considered as closely associated with engineering have about 11%, with an average salary of \$1860., the maximum being \$3000.

It must be remembered that these figures apply only to comparatively recent years, and that the older men are not included for lack of data. It is expected that these data will be available shortly and that a more comprehensive report will be forthcoming.

It should also be realized that during the period to which these figures apply the average wage of the man two or three years out of college did not run so high as it does at present, and that living expenses were materially less.

THE FEDERAL AND STATE PURE FOOD AND DRUG LAWS

By Prof. W. F. Jackman

Probably the history of this country does not present a parallel instance of so great yet peaceful revolution, vitally affecting every household in the land, accomplished with so little apparent public agitation as marked the successful passage of the Congressional Act of June 30, 1906, commonly known as the Federal Pure Food and Drug Law. The full magnitude and significance of this revolution has not been even yet fully grasped, save by some of the affected "interests."

The history of reforms generally shows three well defined preliminary periods. First, the long Aozoic Age of seemingly despairing agitation and fruitless public enlightenment carried on by a few unconquerable enthusiasts; second, the period in which the aroused public interest and conscience passes from the academic to the active stage; third, the period of overflow and breaking away of the crumbling levees of Conservatism, marking the incoming of the triumphant reform wave. As already suggested these long preliminary first and second reform periods seemed largely missing as forerunners in the case of the above mentioned law. Actually however they were not missing. Decades of pure food agitation, in and out of Congress, had been waged before the "embalmed beef" disclosures of the Spanish-American War and the revelations and enlightenment begun by the Ladies' Home Journal, followed by Collier's and continued and amplified by the popular magazines, aroused and directed the public will to the demanding of remedial legislation in the way above noted. Congress, which for years had contemptuously pigeon-holed every bill of similar purpose, was scared into passing it. The lobby was for once powerless.

Every reform has its martyrs and heroes. Not going back to the period of the Spanish-American War, first among martyrs in the cause of Pure Food and Drugs reform was Editor Bok, whose aggressive campaign resulting in a personal fine of \$50,000—a gross miscarriage of justice—is yet fresh in memory. While not to be accounted wholly as martyrs, yet as valued propagandists, maligned and misunderstood, we place next those magazine writers whom President Roosevelt, by an unfortunate abuse both of the facts and of the established meaning of a classic English allusion, termed "muck-rakers." Next, as having well earned and as being well worthy to wear the martyr's crown, we must place Dr. Wiley. All of

these are men whose names are worthy of permanent place in public memory and affection.

The Pure Food Law, as interpreted by D. Wiley, had the merit of precise and definite meaning. His luminous summation of its spirit, "Make the label tell the truth," will live, with the picturesque expression of General Miles, as an American classic. In spite of the many difficulties of new and radically different problems confronted, difficulties inherent and added to by disloyalty to the spirit of the law on the part of his associates and bureaucratic superiors, and in spite of his retirement, Dr. Wiley's administration was a profound success. In the nearly 1500 suits brought by him against violators of the law, the courts have generally sustained his rulings; perhaps the only serious exception being their refusal to hold under the law manufacturers of nostrums to account for untruthful claims as to pretended therapeutic virtues in their alleged remedies. This however, as President Taft indicated in a special message, merely notes an omission in the law which Congress must supply.

At a hearing before a committee of the United States Senate, sitting in Chicago (before the passage of the Pure Food Law) in answer to a question as to the extent of falsification or adulteration of manufactured food products Dr. Wiley said that about 90 per cent might be so denominated. This statement was quite generally denounced by the press at the time as a gross exaggeration; but Dr. Wiley spoke with knowledge based on his departmental data, involving many and a wide range of analyses.—conclusions also which were borne out by state and city Food Commissioners, adulteration reports of pharmaceutical and other associations, and reports of numerous private analysts. Owing to his vigorous aggressive policy the situation is now radically different.

Under the old regime the honest manufacturer was unfairly handicapped by the dishonest and unsuspected falsifications of unscrupulous competitors. Now goods may be bought and sold on merit, and the consumer may know what he is getting. Grosser frauds have largely disappeared, with the result that many are clamoring for similar laws to apply to fabrics and general merchandise. The moral tone of trade has improved, and the commercial value of honesty is beginning to be understood in unexpected quarters. Just as has happened in the instance of fertilizers and cattle foods, which are now very rarely below the standards claimed, daily history is recording a similar elevation of quality in human foods and drugs, and for a similar reason—wise legislation enforced by faithful and energetic executives, state and federal.

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As a result of this laboratory demonstration that a good law if backed by good men may be made to work, the people are not likely, in this field of legislation, to be in a mood to submit to any substitute; or to a weakening of the law through amendments, or officials, hostile to its spirit. One outcome of this will be a certain and general "shake up" in the Department of Agriculture; and the successor to the mantle of Wiley will have to be of like mettle, if not of like calibre.

Of all the benefits flowing from Dr. Wiley's administration none nor all compare with the moral benefit to the people themselves. And from this high-tide mark in public enlightenment, zeal and civic righteousness there can never be a relapse to the low level of the "former times of our ignorance."

TEST ON AIR COMPRESSORS, CATSKILL AQUEDUCT, NEW YORK CITY

By C. G. Cummings, 1910

The construction of the so called "Catskill Aqueduct," by means of which Greater New York is to obtain its future water supply is second only to the Panama Canal from an engineering standpoint. The total length of this great system when completed will be approximately one hundred miles and for a great part of the way a tunnel is being constructed through solid rock.

The progress and details of the work have been thoroughly discussed from time to time in the various engineering magazines so the writer will not dwell on those points in this article, but will pass directly to what is known as Shaft No. 14, of Contract No. 66. This shaft is located in Central Park near 81st Street and Central Park West, New York City, and it is the writer's intention to give the readers a brief, yet clear description of the compressed air plant which is located here and also give an outline of an efficiency test which was conducted at this shaft and at Shaft No. 16 on a compressor of approximately the same displacement.

The compressor plant at Shaft No. 14 consists of three direct connected, two stage machines with rotary inlet valves. Each machine has a piston displacement of 2070 cu. ft. of free air per minute when running at 188 R. P. M. The following are the dimensions:—Diameter of L. P. cylinder 26"; diameter of H. P. cylinder 15½"; length of common stroke 18". Each compressor is driven by a Westinghouse 400 H. P., three phase, 25 cycle, 6600 volt synchronous motor mounted on the shaft and having a rated speed of 188 R. P. M. The exciter for each motor is a

Westinghouse 15 K. W., 125 volt machine mounted on the frame of the compressor and driven by a belt from a pulley which is bolted to the flywheel of the compressor.

There is but one compressor at Shaft No. 16, and this machine supplies air for this shaft alone while the plant at Shaft No. 14 furnishes air for Shafts 13, 14 and 15. The machine at Shaft No. 16 is of the two stage type with a hollow piston inlet and has a piston displacement of 2119 cu. ft. of free air per minute at 188 R. P. M. The following are the dimensions:—Diameter of L. P. cylinder 21¼"; diameter of H. P. cylinder 15¼"; length of common stroke 21". This compressor is driven by a Crocker-Wheeler motor similar to the Westinghouse which is on the machines at Shaft No. 14.

The writer will describe the test as run on the rotary inlet machine as the two tests were exactly similar. The air is compressed in two stages, the pressure at the end of the first stage being about 32 pounds. From the low pressure cylinder the air passes directly to a vertical intercooler made up of copper tubes through which water is continuously circulating. The air enters the high pressure cylinder from the intercooler and here the pressure is raised from 32 pounds to approximately 100 pounds at which pressure it enters the receiver and from here is distributed to the shafts. Compressor No. 3 was used at shaft No. 14 for the test and the results sought were (1) Delivery efficiency, (2) power consumption and (3) Amount of cooling water used.

There are a few points in regard to the two machines which it might be well to mention. As stated above the compressor at Shaft No. 14 is equipped with rotary inlet valves which are very similar to Corliss valves. The air intake is controlled by an automatic unloading valve so regulated that the air inlet is either wide open when the compressor is loaded or entirely closed when running unloaded. A pipe line leads from the air receiver to the unloader and a change of pressure of five pounds in the receiver acts on a piston which either opens or closes the valve as the case may be. The compressor at Shaft No. 16 has the hollow piston inlet valve mechanism and has a device known as the clearance controller for regulating the air intake. This device is intended to proportion the amount of air delivered to the demand.

The test on each machine was conducted by a prominent consulting engineer of New York City (not City of New York), employed by the contractors and entirely impartial to the manufacturers of the compressors. Engineers of both companies were present at each test and all results were carefully checked. All gauges and

thermometers were carefully tested and the orifices which were used had been calibrated. The temperature of the air intake, air discharge and cooling water were carefully recorded, together with the barometer reading and all the cooling water was weighed. A battery of eight orifices was used, the same being connected to a manifold which was in the main pipe line leading to the receiver. The diameter of these orifices ranged from 3-32" to $\frac{5}{8}$ " and the rotary inlet machine running at 188 R. P. M. maintained a pressure of 98 pounds atmospheric when two $\frac{5}{8}$ ", two $\frac{1}{2}$ " and one 5-16" orifices were open while in the case of the piston inlet machine it was necessary to close the 5-16" orifice to maintain the required pressure.

The actual amount of air delivered by each compressor at the given temperature and pressure was calculated by Fliegner's formula,

$$G = .53A \frac{P}{\sqrt{T}}$$

Where G = Pounds of air per second

A = Area of orifices in square inches

P = Absolute pressure in lbs. per sq. in. at orifices

T = Absolute temperature Fahr. at orifices

The amount of air delivered was found to be 1814 Cu. Ft. per minute for the rotary inlet machine and 1676 cu. ft. for the piston inlet machine. Then with a piston displacement of 2070 cu. ft. in the first instance the delivery efficiency was 87.7%. In the second case with a piston displacement of 2119 cu. ft. the delivery efficiency was 79.1% or a difference in favor of the rotary inlet type of compressor of 8.6%.

The power input at full load for the rotary inlet machine was 313.3 K. W. or 420 H. P. and for the other type 299 K. W. or 401 H. P. As the load factor decreased the difference in K. W. input was very largely in favor of the rotary inlet compressor so that at the estimated load factor of 60% under ordinary working conditions the saving in the power cost alone for one rotary inlet compressor would be \$1845.00.

The amount of cooling water used on the rotary type machine was one-half ($\frac{1}{2}$) gallon per 100 cu. ft. of air and on the other compressor was one gallon per 100 cu. ft. of air. As the inter-cooler tubes on the former machine are made of copper it was not necessary to use as much water here due to the superiority of radiation of the copper over the iron tubes in the piston inlet compressor. In the case of this latter machine the manufacturers hoped to get better power economy by using more water through their intercooler, thus lowering the temperature of the air before it entered the high pressure cylinder. It is true that the temperature was lowered this way, but the H. P. per 100 cu. ft. of air was 23.28 for the rotary type machine against 23.9 H. P. for the other. When the cost of water used for one year is considered, as it certainly must be in an installation of this kind where all the water is metered, it will be seen that as little as possible is to be used and yet maintain the power economy.

In conclusion the writer will say that the test described above was conducted under ordinary working conditions and no special preparations were made.

NEWS ITEMS

Professor Aubert was quite ill in the winter but has slowly been gaining strength and hopes soon to be about and his normal self once more. He is living at 118 East 62nd Street, New York City.

The introduction of a special short session of practical work for chemists and chemical engineers is being planned. A course of this character is required at Worcester Polytechnic Institute and it is conducted in somewhat the same manner as the junior field course of the Maine Civils.

The class in industrial chemistry in charge of Mr. Buswell took a three-day trip this spring, visiting a number of the most important industrial plants of the state. This new feature is to be a part of the course hereafter and will be required of chemists and chemical engineers.

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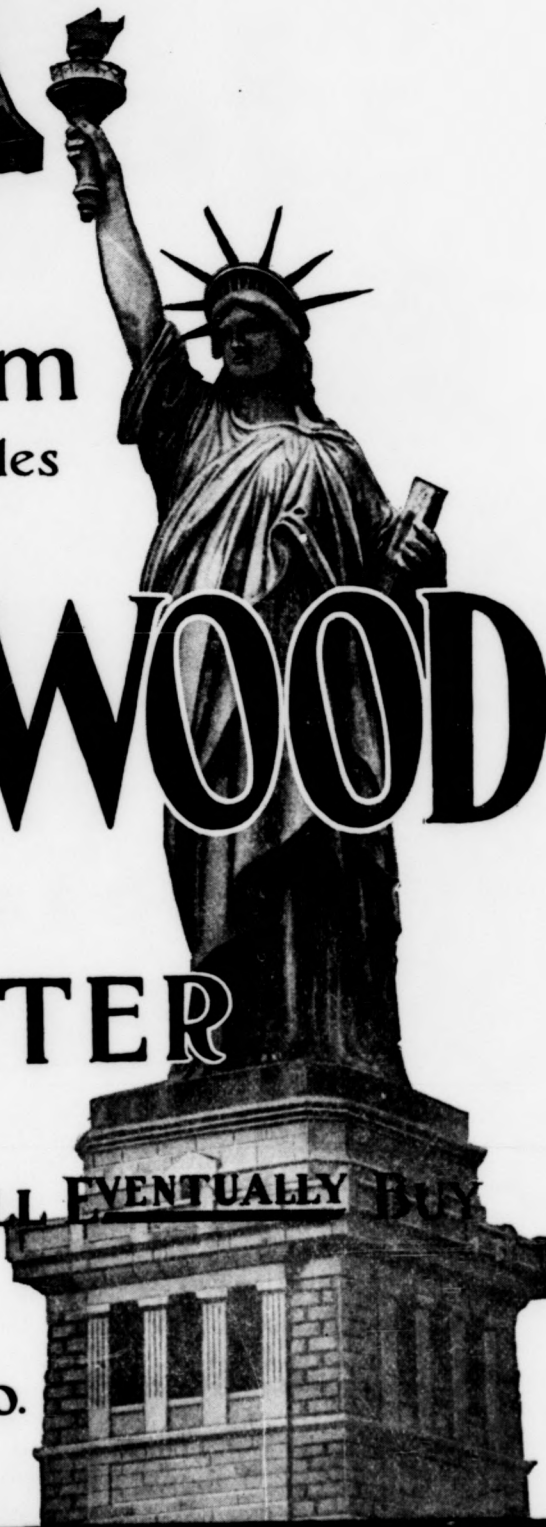
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