INDEX

A

Abrasions (see also Wet beating), 102, 135
Action (see Beating, Cutting, Wetting, etc.)
Angle, cutting, 23, 173, 204
— cutting, maximum and minimum, 173, 177, 204
— cutting, relation to cutting effect, 177
— plate (see Bedplate)
Apparatus for friction tests, 113, 125
— for wetness testing (see Beating tester)
Author's preface, v

Beating, effect of, on character of the stuff, 5
— action, effect of pressure and consistency on, 57
— coefficient, 92, 101, 128
— coefficient, relation to roll speed, 104
— coefficient, relation to roll pressure, 105
— coefficient, specific, 139
— degree, 67
— output, 5
— pressure, 39, 51
— surface, 24, 28
— tackle, design of, 49
— tackle, mechanics of, 23
— tester (Schopper-Riegler), 18, 19, 43, 67, 72, 197
— tester (Skark), 19
— tests, comparative, 77
— theory of, 31
— time, 49, 80, 101
Bedplate bars, clogging of, 64
— bars, intersection with flybars, 26
— bars, thickness of, 46, 54
Bedplates, elbowed, 24, 30, 176
— zigzag, 30, 176
Belt pull, effect of, 93
Blocks, friction, 114
Boats, experimental, 154

Backfall, height of, 149
Backfall, pocket, friction losses in, 158, 170
Bars, parallelism of, 173
— slant of, 23
— spacing of, 61, 190
Beadle, Clayton, and Stevens, 4, 14, 15, 17, 18, 71, 77, 101, 173, 176, 197
Bearing pressure, 61, 98
Bearings, friction in, 91, 98
<table>
<thead>
<tr>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity, output, 41</td>
<td>Dehydration, 22</td>
</tr>
<tr>
<td>Capillary force, effect of, on</td>
<td>Delivery of stuff by roll, 171</td>
</tr>
<tr>
<td>drainage, 19</td>
<td>Design, errors of, 85</td>
</tr>
<tr>
<td>Cells, roll, filling of, 32, 65,</td>
<td>Doctor, effect of, 169</td>
</tr>
<tr>
<td>81, 195</td>
<td>Drainage, 18, 21, 198</td>
</tr>
<tr>
<td>— width of, 190</td>
<td>Drawing out of fibres, 15</td>
</tr>
<tr>
<td>Centrifugal energy, 169</td>
<td>Dry capacity, 2</td>
</tr>
<tr>
<td>Character of stuff, 11, 21,</td>
<td>E</td>
</tr>
<tr>
<td>39, 43, 46, 51</td>
<td>Eddying of stuff in roll cells,</td>
</tr>
<tr>
<td>Circulation, effect of, on</td>
<td>.34, 66, 85, 198</td>
</tr>
<tr>
<td>fibrage formation, 36, 80</td>
<td>Edge pressure, 27, 39, 47, 57,</td>
</tr>
<tr>
<td>— effect of, on output, 5, 31,</td>
<td>108, 143</td>
</tr>
<tr>
<td>82, 199</td>
<td></td>
</tr>
<tr>
<td>— factors affecting, 82, 149,</td>
<td></td>
</tr>
<tr>
<td>190</td>
<td></td>
</tr>
<tr>
<td>— power absorbed in, 91</td>
<td></td>
</tr>
<tr>
<td>— uniformity of, 147</td>
<td></td>
</tr>
<tr>
<td>Clearance between roll and</td>
<td></td>
</tr>
<tr>
<td>bedplate, 12</td>
<td></td>
</tr>
<tr>
<td>Cleavage, resistance to, 155</td>
<td></td>
</tr>
<tr>
<td>— surfaces of, in stuff, 42, 152</td>
<td></td>
</tr>
<tr>
<td>Clogging of bedplate bars, 64</td>
<td></td>
</tr>
<tr>
<td>Clump (see Flybars, spacing of)</td>
<td></td>
</tr>
<tr>
<td>Coefficient (see Friction, Tearing,</td>
<td></td>
</tr>
<tr>
<td>etc.)</td>
<td></td>
</tr>
<tr>
<td>Consistency, 39, 43, 46, 184</td>
<td></td>
</tr>
<tr>
<td>— critical, 63, 76</td>
<td></td>
</tr>
<tr>
<td>— relation of, to specific short-</td>
<td></td>
</tr>
<tr>
<td>ening performance, 62</td>
<td></td>
</tr>
<tr>
<td>— relation of, to specific wetting</td>
<td></td>
</tr>
<tr>
<td>performance, 74</td>
<td></td>
</tr>
<tr>
<td>Contact, surface of, between bars, 29,</td>
<td></td>
</tr>
<tr>
<td>52</td>
<td></td>
</tr>
<tr>
<td>Cross, C. F., 34</td>
<td></td>
</tr>
<tr>
<td>'Cross and Bevan, 176</td>
<td></td>
</tr>
<tr>
<td>Crushing (see also Wetting, Tearing), 5</td>
<td></td>
</tr>
<tr>
<td>201</td>
<td></td>
</tr>
<tr>
<td>Crushing formula, Jagenberg, 17, 30,</td>
<td></td>
</tr>
<tr>
<td>201</td>
<td></td>
</tr>
<tr>
<td>Cutting action of beater bars, 12, 197</td>
<td></td>
</tr>
<tr>
<td>— action, control of, 39</td>
<td></td>
</tr>
<tr>
<td>— action, effect on length of fibres,</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td></td>
</tr>
<tr>
<td>— angle, 23, 173, 204</td>
<td></td>
</tr>
<tr>
<td>— angle, maximum and minimum, 173, 177,</td>
<td></td>
</tr>
<tr>
<td>204</td>
<td></td>
</tr>
<tr>
<td>— effect, 4, 38, 59, 71, 175</td>
<td></td>
</tr>
<tr>
<td>— effect, calculation of, 38</td>
<td></td>
</tr>
<tr>
<td>— effect, comparison of, in different</td>
<td></td>
</tr>
<tr>
<td>beaters, 39</td>
<td></td>
</tr>
<tr>
<td>— effect, factors governing, 39</td>
<td></td>
</tr>
<tr>
<td>— effect, maximum, 63, 76</td>
<td></td>
</tr>
<tr>
<td>— effect, relation to cutting angle, 177</td>
<td></td>
</tr>
<tr>
<td>— length per second and dry capacity, 2</td>
<td></td>
</tr>
<tr>
<td>— length, meaning of, 24</td>
<td></td>
</tr>
<tr>
<td>— resistance, 102, 144</td>
<td></td>
</tr>
</tbody>
</table>
Eichhorn, 150
Elbowed bedplates, 24, 30, 176
Energy (see also Power)
— centrifugal, 169
— consumed in whipping, 147
Experiments (see also Tests)
— frictional, 113, 125
— on power consumption, 91
— on wear of flybars, 35

F
Felting, effect of, 130
Fibrage, definition of, 34
— experiments with rods, 33, 183
— formation of, affected by circulation, 36
Fibrages, 35, 51, 175, 184, 192, 198, 205
— conditions governing formation of, 39, 181, 205
— effect of, on wear of bars, 35
— in Jordan refiner, 181
Fibres, drawing out of, 15
— flexibility of, 16
— hydration of, 18
— length of, as affected by cutting action, 14, 40
— swelling of, 18
Fibrillæ, 11, 15
Fillets, trimming down of, 36 "Floating" of beater roll, 13
Flow of liquids through pipes, 159
— nature of, 149
— of stuff through pipes, 159
Flybars, impact of, on stuff, 147
Flybars, intersection with bedplate bars, 26
— planing action of, 33, 187
— selective action of, 186
— spacing of, 61, 190
— thickness of, 46, 51
— wear of, influenced by fibrages, 35
Foreword, ix
Friction blocks, 114
— coefficient of, 103, 115, 139
— experiments, 37, 113, 119, 125
— in roll bearings, 91, 98
— in stuff, internal, 151, 188, 204
— losses in backfall pocket, 158, 170
— static, 123
Frictional resistance of stuff, 157
Fringe, 51
Froude, 151

G
Green, A. B., 12, 39, 185
Gruenewald, W., 186

H
Haussner, 4, 5, 36, 122, 149
Heat, effect of, on stuff, 21
Hofmann, 176
Hood, effect of, 146
Hydration, 18, 198
Hydro-cellulose, 16

I
Inch cuts (see Cutting length)
Igertia of stuff, 191
Internal friction, 151
Intersection between flybars and bedplate bars, 30

* J *
Jagenberg, 3, 30, 176
— crushing formula, 17, 30, 201
Jordan refiner, fibrages in, 181

* K *
Key to mathematical symbols, xvii
Kirchner, 4, 30, 34, 36, 41, 45, 64, 77, 82, 92, 101, 103, 146, 149, 171, 190
Klemm, 5, 17

* L *
Lawn mower, 13, 173
Laws of friction in stuff, 152
Layers of stuff, friction between, 152
Lehmann, 3, 15, 34
Lifting tackle, 59
Liquid, definition of, 150
Liquids, flow of, in pipes, 159
Losses (see Friction)

* M *
Mathematical symbols, key to, xvii
Maxwell, 150

Mechanics of beating tackle, 23
Micro-measurements of fibres, 14
Mucilage, 16, 135

* N *
No-load power consumption, 92

* O *
Output, 50, 181, 193, 199
— as effected by circulation, 5, 31, 199
— capacity, 41
Oxy-cellulose, 16

* P *
Paper, crêped, substitute for beater stuff, 119
Papers, wet beaten, 17
Parallel beater bars, 173
Parallelogram of contact, 52
Peripheral speed, 23
Pfarr, 4, 31, 41, 92, 101, 146, 149
Pipes, flow of liquids through, 159
— flow of stuff through, 159
Poiseuille's law, 19
Power consumption due to whipping, 146, 168
— consumption for beating wood pulp, 112
— consumption, measurement of, 91, 202
— consumption, no load, 92
INDEX

Power consumption, specific, 101, 107, 142, 202
— consumption with parallel bars, 195
Preface, author's, v
Pressure, bearing, 61, 94
— beating, 39, 51
— edge, 27, 39, 47, 57, 108, 143
— roll, 39, 51, 60
Productivity, 44
Propeller, effect of, 79, 195
Pulley, use of, in friction experiments, 125

R

Rags, power consumption for beating, 142
Rate of travel (see Circulation)
Refiner, fibrages in, 181
Rehn, Arnold, 103, 194
Resistance, air, 92
— coefficient of, 103
— cutting, 102, 144
— frictional, of stuff, 157
— of stuff to rotation of roll, 101, 161
Rods, fibrage experiments with, 183
Roll bars (see Flybars)
— cells, eddies in, 34, 66, 198
— cells, filling of, 32, 65, 81, 195
Roll, delivery of stuff by, 171
— depth of stuff in front of, 66, 80
— entry of stuff into, 22, 187
— forces acting on, 94
— power consumed by, 92
Roll pressure, 39, 51, 60
— pressure, relation to beating coefficient, 105
— speed of, relation to beating coefficient, 104
— surface, submerged, 158
— transporting capacity of, 149, 171, 190

S

Schopper-Riegler beating tester, 18, 19, 43, 67, 72, 197
Schubert, 58, 73, 111, 139
Schwalbe, 16
Sedimentation tests (Klemm), 17
Shears, 13, 102
Shortening (see also Cutting)
— performance, specific, 48
Skark, L., 19
— beating tester, 19
Slant of bars, 23
Smith, Sigurd, 21
Softening (see also Wet beating), 16
Specific beating coefficient, 139
— power consumption, 101, 107, 142, 202
— shortening performance, 48
— shortening performance, relation of, to consistency, 62
— wetting performance, 48, 84
— wetting performance relation to consistency, 71
Spitting, 146, 169, 171, 195
Spitting, measurement of, 196
Stevens (see Beadle, Clayton)
Strobach, 4, 5, 79, 103
Stuff, approach of, to roll, 32, 187
— character of, 11, 21, 39, 43, 46, 51
— depth of, in front of roll, 66, 80
— eddying of, in roll cells, 34, 66, 85, 198
— effect of warmth on, 21
— flow of, through pipes, 159
— inertia of, 191
— internal friction of, 151, 188
— motion of round trough, 152
— resistance of, to rotation of roll, 101, 161
Sulphite, friction experiments with, 119
Surface, beating, 24, 28, 44
— of contact, 29, 52, 174
— tension, effect of, on drainage, 19
Summary, 197
Swelling of fibres, 18
Symbols, mathematical, key to, xvii

T

Tearing action, 41, 142, 203
— action, mechanics of, 42
— coefficient, 103, 132, 139
— force, 135
Temperature, effect of, on stuff, 21
Test sheet, specimen, 93
Tests, comparative beating, 77

Theory, agreement of, with practice, 86
Translator’s note, xiii
Travel, rate of (see Circulation)
Trough, effect of, on circulation, 149, 192
— friction against sides of, 151
— motion of stuff in, 152

V

Velocity, critical, 181
— of approach, 187
Viscosity of water, 21

W

Warmth, effect of, on stuff
Water content of hydric fibres, 18
— viscosity of, 21
Wear of bars, 35
Wet beating, explanation of
15, 19, 197, 200
— beating, mechanics of, 4
Wetness, control of, 43, 181
— effect, 12, 20, 43, 76, 119, 197
Wetting performance, specific
48, 84
Whipping, 20, 48, 67, 146
— influence of, on water
18, 68
— power consumed in, 168
Zigzag beating, 25, 119
BOVING and CO LIMITED
HEAD OFFICE: 56 KINGSWAY, LONDON, W C 2

We design, manufacture supply and start up all over the world,

PULP, CARDBOARD & PAPERMAKING MACHINERY,
OF ALL DESCRIPTIONS, EITHER
INDIVIDUAL MACHINES, or COMPLETE PLANTS.
WE SPECIALIZE IN BY-PRODUCT RECOVERY, STEAM SAVING AND GENERAL EFFICIENCY

BOVING & CO

DIGESTERS FOR BAMBOO PULP MILL, INDIA

BOVING & CO LONDON

TELEGRAMS: FOREIGN JENORTEN LONDON
PHONE: JENORTEN PHONE LONDON

TWO PAPER MAKING MACHINES, SWEDEN
SULPHITE PULP MILL, JAPAN

DIFFUSERS FOR GRASS PULP & PAPER MILL, SCOTLAND
Improved Refining Engine (1909 Patent).

Code Word—"Mlfyne."

This is undoubtedly the most efficient Refiner which has ever been produced. It has been designed in such a way as to reduce to the absolute minimum the amount of Time, Labour and Power required for the production of Paper Pulp. A few of the special advantages of this machine are described on the opposite page.
The Most Efficient Refiner ever Produced

*Why it is superior:*

Most economical in power. Everyday working shows an average of 2,800,000 inch cuts per minute per horse power. Compare this with any other Refiner or Beater and the difference will be found impressive.

The only Refiner which can be guaranteed to deliver absolutely uniform pulp.

The action is such that unreduced fibres are automatically retained and receive extra treatment until properly reduced. No other Refiner has this property which is the very essence of Refining.

Large number at work on all classes of paper from grease proof to news, in every class giving an improvement in quality, an increase in quantity and thorough satisfaction.

CORRESPONDENCE INVITED.

BERTRAMS LIMITED
Advertisers' Supplement.

ANDREWS & Co., Ltd.
Blackfriars House,
New Bridge Street,


WOOD PULP AND ESPARTO

Also at 5, Cross St., MANCHESTER.

* Representatives in Scotland:
JQHN M. WATSON & Co., Crownpoint Works,
David Street, GLASGOW.
Paper Machine Wires
(FOURDRINIER WIRES).

WIRES of our SPECIAL RUBY METAL are noted for GREAT STRENGTH, LONG LIFE and SMOOTH RUNNING.

SPECIALY EQUIPPED FOR THE PRODUCTION OF MACHINE WIRES FOR MODERN FAST RUNNING NEWS MACHINES.

Wires supplied to any Width up to 240 in. (6,096 Metres.)

FINE SEAMS COMBINED WITH GREAT DURABILITY A SPECIALITY.

Presse Pate Wires, Cylinder & Washer Covers.
DANDY ROLLS—Wove, Laid, Plain and Watermarked.

Fine Cloths in all Metals up to 200 Mesh.

GEORGE CHRISTIE, Ltd.,
LADYWELL WIRE WORKS,
GOVAN, GLASGOW, SCOTLAND.

Tel. Address: "Ladywell," Glasgow.
The West End Engine Works Co.

EDINBURGH.

HOLLANDER BEATER.

MANUFACTURERS OF ALL KINDS OF

Paper Making Machinery

SPECIALISTS IN BEATING PLANT.
WILLIAM MAKIN & SONS, 27, DARNALL ROAD
SHEFFIELD, ENGLAND

Watermarking Dandy Rolls, Paper Moulds

Telegram: "Descal London."
Telephone: 1798 Hop.

Possessors of the Only Grand Prix
and Gold Medal awarded to the Trade
Machine Wires, &c.
JAMES BERTRAM & SON, LTD.,  
LEITH WALK, EDINBURGH.  
ESTABLISHED 1845.  

SPECIALITY—  
PAPER MAKING MACHINERY  
in all its branches.
PAPER MAKING MACHINERY

PAPER MACHINES
BOARD MACHINES
HOLLANDERS & POTCHERS
TAYLOR'S BEATER & REFINER
TOWER BEATERS
CONICAL REFINERS
BLEACHING TOWER PLANT
THE PERFECT PULPER
COUPER'S PAT. CONCENTRATOR (VACUUM & GRAVITY TYPES.)
THE C & F STRAINER

WE INVITE INQUIRIES IN ALL PAPER MACHINERY MATTERS
ROLLER GRINDING & POLISHING A SPECIALITY

Send for Catalogue

Masson Scott
PAPER MILL ENGINEERS
8 Colt. TOWN MEAD ROAD, FULHAM LONDON SW6
The Paper Makers' Association of Great Britain & Ireland, 1912 (Incorporated.)

LIST OF PUBLICATIONS
BY THE TECHNICAL SECTION.

Proceedings of the Technical Section—Volume I.

Part 1. CONTENTS. Price, 5/-.

The Testing of Wood Pulps. G. H. Gemmell, F.I.C.
Strainers for Papermaking Machines. A. Maclvor, M.I.Mech.E.
Machine Strainers. Supplementary Paper, with Illustrations.
A. Maclvor, M.I.Mech.E.
W. Adamson.

Part 2. CONTENTS. Price, 10/6.

Capt. J. S. Allan.
Chemical Standards for Technical Valuations of Raw Materials.
Dr. J. L. A. Macdonald, D.S.O.
The Steam Turbine in the Paper Mill.
A. G. Groundwater, A.M.I.M.E
A Few Papermaking Puzzles. F. Heckford.
Rise and Development of H.M. Stationery Office as a Purchaser of Paper.
E. A. Dawe.
Developments in Papermaking from an Engineering Point of View.
T. D. Nuttall, C.B.E.
Proceedings of the Technical Section—Volume II.

Part 1.

CONTENTS. Price, 10/6.

Recent Developments in Papermaking. T. D. Nuttall, C.B.E.


Some Technical Notes and Queries. E. J. Guild.

The Cameron Paper Machine. A. W. Foster, B.A.

Part 2.

CONTENTS. Price, 10/6.


Fractional Boiling of Esparto. J. Edington Aitken.

Interchangeable Factors in Esparto Boiling. Alfred W. Smith.

Modern Methods of Evaporation for the Concentration and Recovery of Trade Liquid. James Holmes, B.Sc.


Fine Paper Costing. L. W. Farrow, F.C.A.


Suggested Improvements in Design of Papermaking Machinery. W. C. Whittaker.

The Development in Papermaking from an Engineering Point of View. Discussion.


Proceedings of the Technical Section—Volume III.

Part 1.

CONTENTS. Price, 10/6.


A Few Notes on Research and Industry. C. F. Cross, F.R.S.


Prime Movers. A. G. Groundwater, A.M.I.M.E.


The Interlock Drive for Paper Machines. F. G. Warburton.

The Interlock Drive for Paper Machines. Discussion.


Strainers and their Difficulties. Discussion.

The Rational Use of Filter Papers. E. J. Guild.
Part 2.

CONTENTS.

Rubber Latex in Papermaking. F. Kaye, A.R.C.Sc.
Notes on Beating. Dr. Sigurd Smith.
Vacuum or Suction Boxes. J. Melrose Arnot.
The Action of the Beater in Papermaking. Dr. Sigurd Smith.


Price, 5/-.

Bibliography of Periodical Publications on Papermaking and Allied Subjects during 1921.

Price, 5/-.

Any of the above Publications can be obtained by application to

THE SECRETARY,
(Technical Section),
Papermakers' Association.
26/27, Farringdon Street,

TECHNICAL ABSTRACTS
ISSUED BY

THE TECHNICAL SECTION.

This publication consists of translations and abstracts of the most important technical articles appearing in the Continental Trade Press. It is issued every month, and all particulars, together with terms of subscription can be obtained from

THE SECRETARY,
(Technical Section),
Papermakers' Association,
26/27, Farringdon Street,