

Department of Mines and Resources  
Surveys and Engineering Branch

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Dominion Observatory

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SEISMIC RESEARCH PROGRAM  
ROCK BURST PROBLEM  
LAKE SHORE MINES

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Report No. 13  
Bibliography of Rock Burst Literature

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Ernest A. Hodgson

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OTTAWA

## FOREWORD

It is particularly requested that each person who receives a copy of this rock-burst bibliography will be good enough to bring to the author's attention, as promptly as possible, any errors he may discover in the entries given and to report in detail any other papers which should be included.

For the convenience of those reporting further items, a copy of a Collaborator's Report Form is inserted behind this page. The bibliographical data should be complete as there indicated.

In the case of books the data should include, where possible: Author's Name, Book Title, Publisher's Name, No. pages, No. illustrations, No. graphs, bibliography (if given in book), Price, Date of Publication, Place of Publication.

In the case of articles in a periodical, give: Author's Name, Article Title, Series or Part, Volume, Number, Pagination of Article (first and last pages), No. illustrations, No. graphs, bibliography (if given in article), Date of Publication, Place of Publication.

When the amendments and additions warrant, a supplementary list will be issued, a copy of which will be sent to all collaborators.

Dominion Observatory,  
Ottawa, Canada.

June 9, 1944.



SEISMIC RESEARCH PROGRAM

ROCK BURST PROBLEM

LAKE SHORE MINES

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Report No. 13. Bibliography of Rock Burst Literature

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Ernest A. Hodgson

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The complete bibliographical details of some items of the following list could not be obtained from the single copy coming to the author's attention. It is hoped that these may be furnished by others receiving a copy of the list, who may have access to the necessary information.

1. ALLEN, W., "Notes on Recent Observations of Remnants", Journal, Chemical Metallurgical and Mining Society of South Africa, Vol. 32, No. 1, July, 1931.
2. ALSTON, B. T., "Discussion on Rock Bursts - Their Causes and Prevention", Journal, Chemical Metallurgical and Mining Society of South Africa, 118-121, Sept., 1936.
3. ASSOCIATION OF MINE MANAGERS OF THE TRANSVAAL, "Some Aspects of Deep Level Mining on the Witwatersrand Gold Mines with Special Reference to Rock Bursts", 198 pp., num. fig., tab., etc., Johannesburg, June, 1933.

The above publication contains papers by the following authors: Coe, Altson, Adler, Michel, Scott, Hildick-Smith.

On pp. 197-198 are given a series of notes dealing with rock bursts. These deal with the definition, reporting and mining of remnants as adopted in many Witwatersrand mines.

4. BICHAN, W. James, "Practical Stope Support in Deep Mine Workings", Canadian Mining Journal, Vol. 60, No. 12, 799-803, 3 fig., bib., Gardenvale, Dec., 1939.

Deals in part with the mechanics of rock bursts.

5. BRIGGS, Henry, "Mining Subsidence", Edward Arnold and Co., London, 1929.
  6. BUCKY, Philip B., "Use of Models for the Study of Mining Problems", American Institute of Mining and Metallurgical Engineers, Technical Publications, No. 425, New York, 1931.
  7. BUCKY, Philip B., "Application of Principles of Similitude of Design to Mine Workings", American Institute of Mining and Metallurgical Engineers Transactions, 1934, 25-30, New York, 1934.
  8. BUCKY, Philip B., SOLAKIAN, A. G., and BALDWIN, L. S., "Centrifugal Method of Testing Models", Civil Engineering, New York, May, 1935.
  9. BUCKY, Philip B., and SINCLAIR, D., "Photoelasticity and its Application to Mine-pillar and Tunnel Problems", American Institute of Mining and Metallurgical Engineers, Technical Publications, No. 1140, New York, Jan., 1940.
  10. BUCKY, Philip B., et al., "Rock Bursts" (a symposium), American Institute of Mining and Metallurgical Engineers, Technical Publications, No. 1468, 56 pp., 22 fig., New York, May, 1942.
- This is an important discussion of the various aspects, theories, etc. of the problem of rockbursts.
11. BUTTERFIELD, H. M., "Stope Filling Material with Respect to the Rockburst Problem", Confidential Report of Investigation for Lake Shore Mines, Ltd., Kirkland Lake, 1942.
  12. CHRISTIAN, J. D., "Rock Bursts at the Teck-Hughes Mine", Canadian Mining and Metallurgical Bulletin, No. 331, 550-567, 10 fig., Montreal, Nov., 1939.

The above is the first of a series of papers on the subject of rock-bursts in the Kirkland Lake area to be published under the auspices of a recently-appointed "Rock-Burst Research Committee", under the chairmanship of J. C. Adamson. An introduction to this paper is given by Mr. Adamson.

13. CRANE, W. R., "Rock Bursts in the Lake Superior Copper Mines", U.S. Bureau of Mines Bulletins, No. 309, Washington, 1929.
14. CRANE, W. R., "Mining Methods and Practices in the Michigan Copper Mines", U.S. Bureau of Mines Bulletins, No. 306, Washington, 1929.
15. DONALD, Douglas D., "A Discussion of the Rock Burst Problem". A Thesis Submitted for a Bachelor's Degree in Geological Engineering from Princeton University. Private circulation, 80 pp., 23 fig., bib., New York, 1943.
16. FAYOL, M., and BULLMAN, H. F., "Sur les mouvements de terrain provoqués par l'exploitation des mines", Bulletin de la Société de l'Industrie Minéralogique, II série, Tome 14, 1885.  
Partial translation by H. F. Bullman, College of Engineering, May, 1913, et seq.
17. GANE, P. Q., "Earth Tremors on the Rand", Journal of the Chemical, Metallurgical and Mining Society of South Africa, Johannesburg, Oct., 1939.  
A lengthy review appears on pp. 49-51 of The Mining Magazine, Vol. 62, No. 1, London, Jan., 1940.
18. HOCKING, W. T., "Notes on Rock Bursts in the Nundydroog Mine", Kolar Gold Fields Mining and Metallurgical Society Bulletins, Vol. 8, No. 40, 69-81, 1936.
19. HOPKINS, Harold, "Faulting at the Wright-Hargreaves Mine with Notes on Ground Movements", Canadian Mining and Metallurgical Bulletin, No. 343, 685-707, 15 fig., bib., Montreal, Nov., 1940.
20. HORWOOD, C. B., "Prevention of Rock Bursts on the Rand", South Africa Mining and Engineering Journal, March 11, Johannesburg, 1939.
21. HODGSON, Ernest A., "What is a Rockburst?" The Northern News, Kirkland Lake, Sept. 9, 1943.

The above was the full text of a radio talk

broadcast over CJKL, Kirkland Lake, on Sept. 7 as one of a series sponsored by the mine managers of the Kirkland Lake district. See also Journal, Royal Astronomical Society of Canada, Vol. 38, No. 1, 1-6, Toronto, Jan., 1944. It was also printed in full in the Christmas issue of the Northern Miner, 102-103, Toronto, 1943. It deals particularly with the program of rockburst study being carried out at Lake Shore Mines, Kirkland Lake, Ont.

In the same issue of the Northern Miner (52-53) appears an article by Professor A. Brant entitled "Geophysical Methods Have Role in Prospecting". Although seismic methods are mentioned, they are not stressed, most of the paper dealing with applications of the magnetic method.

22. HODGSON, Ernest A., "Recent Developments in Rockburst Research at Lake Shore Mines", Canadian Mining and Metallurgical Bulletin, No. 377, 313-324, 11 fig., Montreal, Sept., 1943.
23. HODGSON, Ernest A., "Rockburst Research at Lake Shore", The Mining Magazine, Vol. 70, No. 2, 116-118, 1 fig., London, Feb., 1944.
24. HODGSON, Ernest A., "Reports Nos. 1-12, Seismic Research Program, Lake Shore Mines", mimeographed in format similar to this bibliography which is No. 13 of the series; private circulation, Dominion Observatory, Ottawa, 1939-1944.
25. JEPPE, C. W. Biccard, "Review of the Rock Pressure Problem", Journal of the Chemical, Metallurgical and Mining Society of South Africa, Vol. 44, Nos. 1 and 2, 3-11, with discussion by Theo Meyer, F. G. Hill, and O. Weiss (11-20), Johannesburg, July-Aug., 1943.

The paper constitutes the Presidential Address of Professor Jeppe. The discussions by the mover, seconder, and supporter of the vote of thanks might each be termed a paper in itself on the same subject. The paper by Jeppe, without the others, appears in the Canadian Mining Journal (Vol. 64, No. 12, 788-792, Gardenvale, Dec., 1943), with the title "Rock Pressure Problem: Cause, Control and Prediction".



26. JOSEPH, E. H. A., "Rock Bursts: The Mechanism of Crush Bursts", Journal of the Chemical Metallurgical and Mining Society of South Africa, Vol. 39, No. 5, 114-131, 9 fig., bib., Johannesburg, Nov., 1938.

The presentation of the paper was immediately followed by discussion reported on pp. 131-134. This was by: B. T. Altson (pp. 131-132); and L. Bok (pp. 132-134). Later printed discussion on this paper (Ibid., No. 7) is reported in this list as No. 27. Still later, printed discussion appeared in the same journal, No. 8, as follows: By R. G. K. Morrison (pp. 258-260), C. Baring Horwood (pp. 260-265). Numerous valuable references are cited in these last-mentioned discussions. A continuing series of discussions was printed in the same journal, No. 9, March, 1939. These were by: C. J. Gray (pp. 298-301); J. Spalding (pp. 301-304, 3 fig.). Mr. Spalding's discussion was continued in the issue for June, 1939 (No. 12), p. 416, 2 fig.

27. JOSEPH, E. H. A., "Rockbursts - the Mechanism of Crush Bursts", Journal of the Chemical, Metallurgical and Mining Society of South Africa, Vol. 39, No. 7, 198-205, bib., Johannesburg, Jan., 1939.

The above is the discussion of a paper by the author on the same subject, appearing in the indicated publication for November, 1938. The discussion here reported is by Dr. J. R. Dinsdale, Prof. S. J. Truscott, Mr. Thos. Pryor, Dr. F. E. Keep, and Mr. R. E. Palmer.

28. JOSEPH, E. H. A., "Rock Bursts: The Mechanism of Crush Bursts", Journal of the Chemical, Metallurgical and Mining Society of South Africa, Vol. 40, No. 7, 243-257, 14 fig., bib., Johannesburg, January, 1940.

29. LANGFORD, George B., "The Rock Burst Problem", The Canadian Mining and Metallurgical Bulletin, No. 348, 169-182, Montreal, April, 1941.

The above is the text of a paper delivered before the Canadian Institute of Mining and Metallurgy at the Montreal Meeting in March, 1941. The paper was also printed in part in the Northern Miner, pp. 36 and 44, Toronto, March 6, 1941.



30. MINDLIN, R. D., "Stress Distribution Around a Tunnel", Proceedings, American Society of Civil Engineers, New York, April, 1939.

31. MORRISON, R. G. K., "Notes on a Rockburst in the Ooregum Mine", Kolar Gold Fields Mining and Metallurgical Society Bulletins, No. 33, 1932.

32. MORRISON, R. G. K., "Notes on Witwatersrand Mining Practice", Kolar Gold Fields Mining and Metallurgical Society Bulletins, Vol. 50, No. 38, p. 2, 1935.

33. MORRISON, R. G. K., "Points of View on the Rock Burst Problem", Transactions, Canadian Institute of Mining and Metallurgy, Vol. 42, 443-460, Montreal, Aug., 1939.

34. MORRISON, R. G. K., "Report on the Rockburst Situation in Ontario Mines", Canadian Mining and Metallurgical Bulletin, No. 361, 225-272, 18 fig., Montreal, May, 1942.

The above is a very complete analysis of the rockburst situation in Ontario mines, the result of a study extending over three months by the author who has had extensive experience in these matters both in South Africa and in Mysore state, India.

35. NORTHERN MINER, "Rock Burst Menace Attracts Wide Attention, Expert Study", The Northern Miner, p. 33, Toronto, March 7, 1940.

In the same issue is reprinted the article on "Rock Bursts in Lake Shore Mines", by Robson, Adamson, and Selnes, reported as No. 44 in this list.

36. NORTHERN MINER. The above paper carries the two following short articles of interest to seismologists.

(1) "Predicting Bursts by Rock Noises", The Northern Miner, p. 11, Toronto, July, 31, 1941.

(2) "Growth of Safety Measures Reduces Mining Hazards", Ibid., p. 15, Aug. 28.

37. NORTHERN MINER, "Bursts at Lake Shore: Recent Major Adjustments May Settle Conditions for Time", The Northern Miner, Vol. 29, No. 6, p. 2, Toronto, April 29, 1943.
38. OBERT, Leonard, "Measurement of Pressures on Rock Pillars in Underground Mines", U.S. Bureau of Mines, Reports of Investigations, No. 3444, 15 pp., 6 fig., 2 tab., Washington, April, 1939.
39. OBERT, Leonard, "Measurement of Pressures on Rock Pillars in Underground Mines", U.S. Bureau of Mines, Reports of Investigations, No. 3521, 11 pp., 9 fig., 4 tab., Washington, June, 1940.
- This is Part II of the report; Part I was reported as No. 38 in this list.
- The report was printed also in the Canadian Edition of the Engineering and Mining Journal (Vol. 142, No. 7, 52-55, 4 fig., 1 tab., New York, July, 1941).
40. OBERT, Leonard, "Use of Subaudible Noises for Prediction of Rock Bursts", U.S. Bureau of Mines, Reports of Investigations, No. 3555, 4 pp., Washington, Jan., 1941.
41. OBERT, Leonard, and DUVALL, Wilbur, "Use of Subaudible Noises for the Prediction of Rock Bursts, Part II", U.S. Department of the Interior, Bureau of Mines, Reports of Investigations, No. 3654, 22 pp., 9 fig., Washington, July, 1942.
- A review of this paper appears in The Mining Magazine, Vol. 67, No. 3, 114-115, London, Sept., 1942.
42. RANSON, E. C., "Mining to Depth", Journal of the Chemical, Metallurgical and Mining Society of South Africa, Vol. 35, No. 1, Johannesburg, Aug., 1934.
43. ROBERTSON, A. F., "Rock Bursts at Wright-Hargreaves Mine", Canadian Mining and Metallurgical Bulletin, No. 332, 583-592, 6 fig., Montreal, Dec., 1939.

The above is the second of a series of papers dealing with the subject of rock bursts in the

Kirkland Lake area. The first of these was reported as No. 12 in this list.

44. ROBSON, W. T., ADAMSON, J. C., and SELNES, W. E., "III-Rock Bursts at Lake Shore Mines", Canadian Mining and Metallurgical Bulletin, No. 333, 7-30, 15 fig., bib., Montreal, Jan., 1940.

The two preceding papers of this series have been listed, respectively, as No. 18 and No. 43 in this list.

45. SANO, H., "Experiments on Rocks for Elucidating Rock Pressure Problems", Memoirs of the Ryojun College of Engineering (Manchuria) Inouye Commemoration Volume, p. 261, 1934.
46. SINCLAIR, W. E., "Rockbursts - Their Cause and Prevention", Journal, Chemical Metallurgical and Mining Society of South Africa, Vol. 37, 4-10, Johannesburg, July, 1936.
47. SPAULDING, J., "Description of a Rockburst", Kolar Gold Fields Mining and Metallurgical Society Bulletins, Vol. 6, No. 33, 78-81, Johannesburg, June-Dec., 1932.
48. SPAULDING, J., "Theory of Rock Pressure", Kolar Gold Fields Mining and Metallurgical Society Bulletins, Vol. 8, No. 41, 153-171, Johannesburg, 1935-1937.
49. SPAULDING, J., "The Theory and Practice of Ground Control", American Institute of Mining and Metallurgical Engineers, Transactions, 1937-1938, American Institute of Mining and Metallurgical Engineers, Bulletins, New York, Oct., 1937.
50. SUGIHARA, T., and SEZAWA, K., "Stresses in Country Rock Around a Vertical of an Inclined Circular Shaft", Journal, Faculty of Engineering, Vol. 20, No. 5, Tokyo University, June, 1932.
51. VISSER, W. F., "Extraction of a Shaft Pillar under Maximum Strain", Journal, Chemical Metallurgical and Mining Society of South Africa, Vol. 39, No. 5, 138-145, 4 pl., Johannesburg, Nov., 1938.



The above is a reply to discussion on a previously presented paper on the subject. The discussion was printed in the issue of the same journal for October, 1937.

52. WEISS, Oscar, "The Theory of Rockbursts and the Possibilities of Geophysical Methods in Predicting Rockbursts on the Producing Mines of the Witwatersrand", Journal, Chemical Metallurgical and Mining Society of South Africa, Vol. 39, No. 7, 188-197, 1 fig., 2 tab., bib., Johannesburg, Jan., 1939.

The above is a reply to discussion of an earlier paper by the above author on the same subject, published in the Jan., 1938, issue of the publication indicated.

53. WEISS, Oscar, "Experiments on the Fracturing of Witwatersrand Quartzites under Direct Pressure", Journal, Chemical Metallurgical and Mining Society of South Africa, Vol. 41, No. 9, 355-363, 6 fig., bib., Johannesburg, March, 1941.

The last three pages, included in the above pagination, are devoted to the discussion of the paper, by J. H. Taylor and by W. J. Walker. Professor Walker's discussion is illustrated by one diagram.

54. WEISS, Oscar, "The Causes of Rockbursts", South African Mining and Engineering Journal, Johannesburg, Oct. 3, 1942.

A full review of this important paper appears in the Mining Digest section of the Mining Magazine, Vol. 67, No. 6, 337-340, London, Dec., 1942.

55. WEISS, Oscar, "Causes of Rockbursts", South African Mining and Engineering Journal, Vol. 53, Part 2, No. 2592, pp. 103, 105, and 107, Johannesburg, Oct. 3, 1942.

56. WELDON, L. S., and ROBSON, W. T., "Mining Methods at Lake Shore", Canadian Institute of Mining and Metallurgical Engineers, Transactions, Vol. 39, Montreal, 1936.

57. WITWATERSRAND ROCK BURST COMMITTEE REPORT 1924, Pub-

lished in 1925 by Cape Times, Ltd., Government Printers, Cape Town, S.A. Price 5s 6d. pp. 1-65. Illustrated. Deals with the investigation into the frequent shocks experienced in the Witwatersrand area in South Africa due to the collapse of supporting rock sections left in the mines.

58. YAMAGUTI, S., "On Stresses Around a Horizontal Circular Hole in a Gravitating Elastic Solid", Journal, Civil Engineering Society of Japan, Vol. 15, 291-303, 1929.

Dominion Observatory,  
Ottawa, Ontario,  
June 12, 1944.

E. A. H.

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