

# SELECTED BIBLIOGRAPHY ON APPLICATIONS OF ELECTRICITY IN FISHERY SCIENCE

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### Explanatory Note

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United States Department of the Interior, Douglas McKay, Secretary,  
Fish and Wildlife Service, John L. Farley, Director

SELECTED BIBLIOGRAPHY ON THE APPLICATIONS OF ELECTRICITY  
IN FISHERY SCIENCE

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# SELECTED BIBLIOGRAPHY ON THE APPLICATIONS OF ELECTRICITY

## IN FISHERY SCIENCE

Applications of electricity in commercial fishing, in fish-salvage operations, and as a research tool are growing rapidly in importance. Unfortunately, it has been difficult for investigators to review progress and accomplishments in this field since the literature, although fairly extensive, is widely scattered. Furthermore, knowledge of a rather complex array of technical subjects in (among others) the fields of physiology, fishery biology, electronics, and electrical engineering has been required for the development of successful applications. Investigators have, therefore, been hampered frequently by a lack of familiarity with the literature outside their immediate field of specialization. It is the purpose of this publication to present a selected list of technical, semi-popular, and popular reports, both published and unpublished, which may prove useful to those who are attempting to apply electricity to a specific fishery problem.

This bibliography includes reports appearing through the calendar year 1953 which are directly or indirectly related to the application of electric current in or to the water for the purpose of influencing or controlling fish movement or for capturing fishes or other aquatic organisms. Similar uses of light and sound are not included. Coverage of the literature on fundamental researches of the reactions of fishes to electrical stimuli is comprehensive. A selection of references in the general field of electrophysiology and on the reactions of organisms other than fishes to electrical stimulation is included. Further information on the reactions of plant and animal tissues and of whole organisms (other than fishes) to electrical stimuli may be had by consulting extensive bibliographies presented in the following papers cited in this report: Gerard 1942; Scheminzky 1923; Scheminzky, Scheminzky, and Bukatsch 1941; and Wallengren 1903a.

Coverage of technical and popular accounts of specific applications of electricity in fishery science is likewise comprehensive; both engineering and biological considerations are contained in some of these reports. Further selected reports have been included which may be of aid in instrumentation or which describe useful test instruments. A few papers are cited which discuss the general subject of electrostatic fields; others describe the characteristics of electrical fields in fluid media. Articles dealing specifically with the characteristics of electrical fields in natural waters and the modifying effects of varying natural conditions on these fields appears non-existent. Some information may be gleaned, however, from several of the reports cited herein which are concerned primarily with other topics.

In addition to the reference material previously indicated, a separate list is presented of patents granted by the United States

Patent Office which are pertinent to the subject of this report. This list is the product of an investigation conducted by the legal firm retained by Cook Research Laboratories, Inc., Chicago, Illinois, while under contract to the Fish and Wildlife Service. Presumably it records, among the several arts included, the most significant patents granted for "fish screens" and similar devices through the calendar year 1950. A subsequent search indicated that no further patents of this type were granted at least through 1952.

Nearly all of the citations presented have been checked for accuracy by comparison with the original articles or with suitable reproductions (photostats, microfilms, ...); five papers for which originals could not be located were checked against typewritten "record" copies. Those citations not verified by one of the two procedures are identified by an asterisk (\*). Transliterations and translations of citations in Russian and Japanese have been verified by experts in those languages.

Several inconsistencies that will be apparent in the method of citation have been introduced to facilitate the location of the periodicals involved. City of publication is not usually given. It is included, however, for those foreign journals that are entered in the catalogs of certain libraries under place of publication. For some trade journals and non-technical publications, the date of the particular issue cited is given since that information is frequently more helpful than a knowledge of volume and issue number.

Following citations, references are given to known abstracts, summaries, reviews, reprintings, and available translations. Most summaries, reviews, and reprintings indicated in these annotations are not cited elsewhere in the body of the bibliography. Abstract systems referred to are as follows:

- (1) Biological Abstracts, University of Pennsylvania, Phila., Pa.
- (2) Commercial Fisheries Abstracts, U. S. Dept. of the Interior, Fish and Wildlife Service, Washington, D. C.
- (3) World Fisheries Abstracts, Food and Agriculture Organization of the United Nations, Rome, Italy.

Desirable as it might be to subdivide this bibliography into sections under various subjects, that procedure proved impractical. Many of the references deal with a considerable diversity of subject matter. Any attempt at subdivision accordingly would entail an unreasonable amount of repetition or cross-referencing.

PART I

Published reports

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(3) Elektrische Waltötung, by Kurt Schubert, pp. 35-36;  
(4) Zur Praxis der elektrischen Waltötung, by W. Reichert,  
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PART II

Typewritten and processed reports and other material having a  
restricted distribution

[The source and/or present location of the following reports are indicated as completely as possible in the citations or in annotations; presumably all may be examined upon written request to the sponsoring agency.]

- Anon. ? Elektro-kescher (or: The handy catch apparatus for fishermen.)  
Adv., Kreutzer-Peglow Co., Hamburg, Germany.
1938. The electric fish screen as tested on the Gold Hill Irrigation Canal, Gold Hill, Oregon, Summer 1937.  
Fishtite Electric Screen Co., Mineo., 8 pp.  
  
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1939. Burkey electric fish screen.  
Adv. (Description and diagrams), Electric Fish Screen Co.,  
1130 N. Poinsettia Pl., Hollywood 46, Calif.
1941. Electric fish screen demonstration conducted for the California Division of Fish and Game by the Electric Fish Screen Company at Mt. Shasta, California.  
Calif. Dept. Fish and Game, Typewr., 7 pp.  
  
Copy on file, Fish and Wildl. Serv.
1943. Summary report of electric fish screen tests at Hat 2 Power House Intake, June and July, 1943.  
Calif. Dept. Fish and Game, Typewr., 10 pp., subm. Sept. 29, 1943.  
  
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- Applegate, Vernon C., B. R. Smith, and W. L. Nielsen  
1951. Development of an electromechanical sea lamprey weir and trap.  
U. S. Dept. Int., Fish and Wildl. Serv., Great Lakes Fish. Invest., Progress Rept., Mineo., 5 pp.

Baker, Shirley

1930. Progress report of investigations on fish screens and fish ladders by U. S. Bureau of Fisheries. Ann. Meeting of the Internat. Pacif. Salmon Federation, Mar. 28-29, 1930, Typewr., pp. 20-22.

Baker, Shirley, and U. B. Gilroy

1931. Progress report for 1930 on the investigation of method and means of conserving fish life by means of proper fish screens and fish ladders. U. S. Bur. Fish., Typewr., 53 pp., subm. Apr. 15, 1931.

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1932. Progress report for 1931 on the investigation of method and means of conserving fish life by use of proper fish screens and fish ladders. U. S. Bur. Fish., Typewr., 28 pp., subm. Jan. 1, 1932.

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1933. Progress report for 1932 on the investigation of methods and means of conserving fish life by use of proper fish screens and fish ladders. U. S. Bur. Fish., Typewr., 12 pp., subm. Mar. 15, 1933.

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Barnett, G.

1936. A vacuum tube crest voltmeter. U. S. Bur. Fish., Typewr., 23 pp.

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Gilroy, U. B.

1929. (Electric fish screens.) Proc. of Meeting of Exec. Comm. of Internat. Pacif. Salmon Invest. Federation, Vancouver, B. C., Apr. 5, 1929, Typewr., pp. 88-94.

Hatton, S. R., and G. H. Clark

1941. Tests on the electric fish screen at Lake Yosemite. U. S. Dept. Int., Fish and Wildl. Serv., Typewr., 3 pp.

McMillan, F. O.

1929. The electrical characteristics of the Burkey electric fish diverter.  
U. S. Bur. Fish., Typewr., 12 pp., subm. Feb. 7, 1929.

Copy on file, Fish and Wildl. Serv.

McMillan, F. O., and H. G. Barnett

1935. Preliminary report on U. S. Bureau of Fisheries electric screen investigation at Oregon State College.  
U. S. Bur. Fish., Typewr., 17 pp., 7 figs., 2 tables.

Copy on file, Fish and Wildl. Serv.

McMillan, F. O., and Alton Everest

- \*1937a. The design of an impulse generator for electric fish screen research.  
U. S. Bur. Fish., Dittoed, ? pp.

Copy on file, Fish and Wildl. Serv.

- 1937b. Sixty-cycle, single- and three-phase electric fish screen.  
U. S. Bur. Fish., Dittoed, 13 pp.

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- 1937c. Summary of 1937 electric fish screen investigations.  
U. S. Bur. Fish., Typewr., 9 pp.

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McMillan, F. O., H. B. Holmes, and F. A. Everest

1937. The response of fish to impulse voltages.  
U. S. Bur. Fish., Dittoed, 15 pp.

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Siegfried, J. H.

1921. Experiments to determine efficiency of electric fish stop.  
Typewr., 3 pp.

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Smith, Andrew V.

1951. Some new proposals for electric fish screens.  
Dept. Elec. Engineering, Oregon State Coll., Typewr.,  
11 pp.

Copy on file, U. S. Army Corps of Engineers, Portland, Ore.

Volz, Charles D.

1951. The Magnetron panel.  
U. S. Dept. Int., Fish and Wildl. Serv., No. Pacific  
Fish. Invest., Processed, 2 pp., Aug. 1, 1951.

Weber, K. G., and C. D. Volz

- 1952a. Electroparalysis of chinook salmon.  
U. S. Dept. Int., Fish and Wildl. Serv., Pacific Salmon  
Invest., Processed, 6 pp., subm. Oct. 6, 1952.

- 1952b. Electroparalysis of chum salmon for spawntaking purposes.  
U. S. Dept. Int., Fish and Wildl. Serv., Pacific Salmon  
Invest., Processed, 4 pp., subm. Jan. 9, 1952.

Webster, Dwight A.

1950. Results of electric shocking demonstration in Fall Creek,  
Ithaca, New York, May 16, 1950.  
Dept. of Cons., Cornell Univ., Dittoed, 2 pp.

Webster, Dwight A., and Students

1953. A comparison of alternating and direct electric currents  
in fishery work.  
Dept. of Cons., Cornell Univ., Processed, 6 pp.

Wolf, Ph.

1948. Electrical fishing.  
Typewr., 2 pp.

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PART III

Patents granted by the United States Patent Office

[Patents are first listed in numerical order with date patented, inventor's name, and title of disclosure given for each entry; following this, an alphabetical index is presented. Copies of these patents may be obtained at nominal cost from the United States Patent Office, Washington, D. C.]

Numerical list

No. 794,573 Patented July 11, 1905

Inventor: Michael Ward  
Title of disclosure: Apparatus for catching fish.

No. 855,588 Patented June 4, 1907

Inventor: Thomas N. Prudden  
Title of disclosure: Method and apparatus for protecting marine wooden structures.

No. 978,872 Patented Dec. 20, 1910

Inventor: Charles K. Freer  
Title of disclosure: Device for driving fishes.

No. 1,269,380 Patented June 11, 1918

Inventor: Henry T. Burkey  
Title of disclosure: Electric fish-stop.

No. 1,292,246 Patented Jan. 21, 1919

Inventor: Henry T. Burkey  
Title of disclosure: Electric fish-stop.

No. 1,486,083 Patented Mar. 4, 1924

Inventor: Charles Kaater Freer  
Title of disclosure: Device for driving fishes.

- No. 1,515,547 Patented Nov. 11, 1924  
Inventor: Henry T. Burkey  
Title of disclosure: Electric fish stop.
- No. 1,838,981 Patented Dec. 29, 1931  
Inventor: Jonas Edwin Anderson  
Title of disclosure: Electrical fishing apparatus.
- No. 1,882,482 Patented Oct. 11, 1932  
Inventor: Henry Theodore Burkey  
Title of disclosure: Fish diverter for irrigation ditches, flumes, natural waterways, and the like.
- No. 1,962,420 Patented June 12, 1934  
Inventor: William J. Bradley  
Title of disclosure: Electric insect exterminator.
- No. 1,974,444 Patented Sept. 25, 1934  
Inventor: Henry T. Burkey  
Title of disclosure: Method of and apparatus for electrically diverting fish.
- No. 1,980,452 Patented Nov. 13, 1934  
Inventors: Reuben S. Tice and Mary H. Littlefield  
Title of disclosure: Fishing method and apparatus.
- No. 2,010,601 Patented Aug. 6, 1935  
Inventor: Donald H. Loughridge  
Title of disclosure: Electric fish stop.
- No. 2,146,105 Patented Feb. 7, 1939  
Inventor: Lin E. Baker  
Title of disclosure: Method and device for handling and conservation of fish and the like.



No. 2,163,282 Patented June 20, 1939  
Inventor: Knut Hovden  
Title of disclosure: Means for catching fish.

No. 2,187,400 Patented Jan. 16, 1940  
Inventor: Sam Palos  
Title of disclosure: Electrocuting trap.

No. 2,193,915 Patented Mar. 19, 1940  
Inventor: Lin E. Baker  
Title of disclosure: Apparatus for underwater electric barrier.

No. 2,194,018 Patented Mar. 19, 1940  
Inventor: Eugene Grooms  
Title of disclosure: Floodgate for electric fences.

No. 2,233,045 Patented Feb. 25, 1941  
Inventors: Franklin Samuel Bonner and Mort Roy  
Miller  
Title of disclosure: Electrical fish screen.

No. 2,238,897 Patented Apr. 22, 1941  
Inventor: Ramon Gomez  
Title of disclosure: Electrolytic fishing.

No. 2,271,569 Patented Feb. 3, 1942  
Inventor: Sam Palos  
Title of disclosure: Electrocuting trap.

No. 2,426,037 Patented Aug. 19, 1947  
Inventors: John R. Mahoney and Harry J. Bichsel  
Title of disclosure: Electronic control device for forming impulses.

Inventor: Leo T. Critchlow  
 Title of disclosure: Eel trap.

Alphabetical index

Patentee	Patent Number
Anderson . . . . .	1,838,981
Baker . . . . .	2,146,105
Baker . . . . .	2,193,915
Bonner et al . . . . .	2,233,045
Bradley . . . . .	1,962,420
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Burkey . . . . .	1,292,246
Burkey . . . . .	1,515,547
Burkey . . . . .	1,882,482
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Prudden . . . . .	855,588
Tice et al . . . . .	1,980,452
Ward . . . . .	794,573

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We wish to express our appreciation for the assistance rendered by many individuals who contributed references, provided corrections of citations, loaned originals or reprints of articles for examination, or otherwise assisted in the preparation of this bibliography. We are particularly indebted to the following persons: Miss Margaret I. Smith, Chief Reference Librarian, and Miss Mary E. Rollman of the staff of the University of Michigan Libraries for their assistance in securing the originals, or reproductions, of articles which were not available in that university library; Mr. Harlan B. Holmes for assistance in locating the originals of articles cited in his report on electric fish screens; Mr. Ellwood G. Johnson who assisted in the preparation of portions of the bibliography; and, Dr. Ralph Hile whose editorial advice guided the preparation of this report.



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