

SAN JOSE LABORATORY  
ADVANCED SYSTEMS DEVELOPMENT

May 16, 1960

FILE MEMORANDUM: 5720-7.0

SUBJECT: Bibliography of Communication Theory - Introduction and  
Sub-Section Headings.

This is a listing of existing bibliographies and a listing of new items:

The material is organized in the structure of F. L. Stumpers, "A Bibliography of Information Theory," MIT RLE, Feb. 2, 1953, (also Trans. IRE, No. PGIT-2, Nov., 1953), Supplement Trans. IRE, Vol. IT-2, No. 2, p. 33-44 (Sept., 1955), Second Supplement, Trans. IRE, Vol. IT-3, No. 2, p. 150-166, (June, 1957).

Sections on Russian references, Miscellaneous, and SJ-ASDD Data Transmission Project have been added.

It is assumed that Stumpers will continue his supplements and that some indexing will continue to be done by our library, so this bibliography need not be complete.

This bibliography is not intended to be complete where other groups are providing frequent updating service. For example, A. B. Fontaine, University of Wisconsin, and W. W. Peterson, Massachusetts Institute of Technology, have a Coding Newsletter which is bringing up to date news of coding developments.

Each section is issued as a separate file memorandum when sufficient material has accumulated. The numbering of the separate sections is tabulated on the next page.

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**SUBJECT CLASSIFICATION  
FOR FILE MEMORANDA ON COMMUNICATION THEORY BIBLIOGRAPHIES**

<u>Stumpers Section Number</u>	<u>Subject</u>	<u>Classification in This file</u>
	Introduction . . . . .	*7.0
I.	General Theory . . . . .	7.1
II.	Bandwidth and transmission capacity. Time-frequency uncertainty. . . . .	7.2A
	Signal-to-Noise ratios. Comparison of systems . . .	7.2B
	Instantaneous frequency . . . . .	7.2C
	Analytical signals . . . . .	7.2D
III.	Definition, relation with statistical mechanics, philosophy . . . . .	7.3
IV.	Correlation, prediction, filtering, storage . . . . .	7.4
V.	Radar. . . . .	7.5A
	Radionavigation. . . . .	7.5B
VI.	Speech . . . . .	7.6A
	Hearing . . . . .	7.6B
	Vision . . . . .	7.6C
	Linguistics, semantics . . . . .	7.6D
VII.	Other biophysical applications. (Cybernetics and the nervous system) . . . . .	7.7A
	Human engineering . . . . .	7.7B
	Group communication . . . . .	7.7C
VIII.	Television . . . . .	7.8
IX.	Miscellaneous applications . . . . .	7.9A
	Optics . . . . .	7.9B
	Games . . . . .	7.9C
	Servomechanisms . . . . .	7.9D
X.	Mathematics . . . . .	7.10A
	Statistics . . . . .	7.10B
	Relay algebra . . . . .	7.10C
	Noise analysis. . . . .	7.10D

XI.	Pulse modulation . . . . .	7.11A
	Multiplex . . . . .	7.11B
	Coding (Alphabet) . . . . .	*7.11C
	Coding (Error-Detecting and Correction) . . . . .	*7.11D

Supplements

	Russian References . . . . .	7.12
	Miscellaneous Lists . . . . .	*7.13
	SJ-ASDD Data Transmission Project . . . . .	*7.14

\* An asterisk indicates sections which exist as of this date.

## INDUSTRIAL ARTS INDEX 1953

- COMMUNICATION, Theory of**  
 Bell, Douglas, Shannon, and information theory. R. L. S. *Indus. Eng. Chem. Anal. Ed.* 26:17-19 53  
 Capacity of the information channels of amplitude and phase modulation communication systems. S. M. Attenbary. *Eng. In. J. Radio Eng. Phys.* 4:275-281 53  
 Control laws. Inquiries. F. G. Erik and W. H. Sharby. *Eng. Acoustical Soc. Am. J.* 44:256-6 N 53  
 Correlation coefficient. M. J. E. *Wireless Eng. Tech.* 44:268-71 53  
 Correlation coefficient. M. J. E. *Tele. Tech. J.* 32:111-12 53  
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 Field theory versus probability. D. A. Bell. *Wireless Eng. Tech.* 44:268-71 53  
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- Organization and entropy. J. Redstone. *J. Ap. Phys.* 24:1981-2 53  
 Radio propagation during information theory and modulation systems. Bell. *Eng. In. J. Radio Eng. Phys.* 4:275-281 53  
 Some possibilities for the compression of television signals by recording. E. C. Cherry and D. G. Chaffin. *Eng. In. J. Radio Eng. Phys.* 4:275-281 53  
 What practical benefits can communication theory expect from modern communication theory. *Wireless Eng. Tech.* 44:268-71 53

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 Applications of information theory to data transmission systems and the possibility of a theory of communication channels. R. L. S. *Indus. Eng. Chem. Anal. Ed.* 26:17-19 53  
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 Optics and communication theory. V. Elias. *Eng. In. J. Radio Eng. Phys.* 4:275-281 53  
 Response of linear time-dependent systems to random inputs. D. B. Duncan. *J. Ap. Phys.* 25:100-11 May 54  
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 Spectroscopy from the point of view of communication theory: automatic recording of infrared spectra on punched cards. G. W. King and others. *Opt. Soc. Am. J.* 44:397-402 May 54  
 Spectroscopy from the point of view of the communication theory. A. G. Emile and G. W. King. *Opt. Soc. Am. J.* 44:358-68 Apr 54  
 Statistical criteria for the detection of pulsed current in noise. D. McElleton. *Eng. In. J. Radio Eng. Phys.* 4:275-281 53; Discussion 25:128-30 Ja 54  
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- Coding for constant-data-rate systems. R. A. Silverman and M. Baber. *Bibliog Inst Radio Eng Proc* 42:1428-35; 43:728-35 S '54, Jc '55; Discussion, 43:626 My '55
- Concept of an instantaneous power spectrum, and its relationship to the autocorrelation function. C. H. M. Turner. *J Ap Phys* 25: 1317-21 N '54
- Entropy equivalence in the time- and frequency domains. R. Price. *Bibliog Inst Radio Eng Proc* 43:181-5 Ap '55
- Entropy of information and the odd ball problem. P. J. Kelloff and D. J. Kelloff. *J Ap Phys* 25:1433-9 N '54
- Geometric aspects of least squares smoothing. A. A. Hausser, Jr. *diags Inst Radio Eng Proc* 42:501-4 Ap '54
- Information; now it's the realm of theorists. *News W* p58-60 F JI 30 '55
- Information of elementary multidimensional auditory displays. I. Pollack and L. Ficks. *Acoustical Soc Am J* 26:156-8 Mr '54
- Information theory. H. Robbins. *Inst Radio Eng Proc* 42:1193 JI '54
- Information theory aspects of propagation through time-varying media. J. Feinstein. *Bibliog J Ap Phys* 26:219-29 F '55
- Link between information and energy. J. H. Fetker. *Inst Radio Eng Proc* 40:728-9 Jo '54; Discussion, P. P. Adler. 42:1191; Reply. 1191 JI '54

- Measurement of human channel transmission characteristics. W. A. Manton and J. E. Kurita. *diags Acoustical Soc Am J* 26:512-54 JI '54
- Problem of optimum detection of pulsed signals in noise. A. H. Benzer and R. E. Drenth. *Bibliog diags RCA R* 16:461-79 S '55
- Resolution of signals in white, Gaussian noise. C. W. Helstrom. *Bibliog Inst Radio Eng Proc* 43:1111-18 S '55
- Resolving power and information. G. Toraldo di Franchi. *Bibliog Opt Soc Am J* 45:497-501 JI '55
- Spectral response of a quadratic device to non-Gaussian noise. T. A. Madsen. *Bibliog diags J Ap Phys* 25:1357-65 N '54
- Study of the bubbling blocks in speech. C. M. Harris. *diags Acoustical Soc Am J* 25: 792-9 S '54
- Toward a measure for measuring. L. J. Fogel. *Inst Radio Eng Proc* 43:1015 Ag '55

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- Information and memory. G. A. Miller. *diags Sci Am* 195:42-6 Ag '56
- Information theory. M. L. Klein and others. *Instruments & Automation* 29:1519-24 Ag '56
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- Information theory and optical images. B. H. Linfoot. *Bibliog diags Opt Soc Am J* 45: 808-19 O '55
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- Theory of communication. R. A. Firthorne. *Arch Proc* 6:256-65; Discussion, 265-7 N '54

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Doelz and Heald, "A Predicted Wave Radio Teletype System", Conv. Rec. IRE, Part 8, Vol. 2, (1954) p. 63-67 (Same as Collins Radio Co. Report No. CTR-114).

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Collins and Doelz, "Predicted Wave Signalling" (Kineplex) Collins Radio Co., Report No. CTR-140, June 20, 1955.

H. R. Huntley, "Where We Are and Where We Are Going in Telephone Transmission", Comm. and Electronics, No. 29, Mar. 1957, p. 54-63.

T. A. Combellich and M. E. Ferguson, "Noise Consideration on Toll Telephone Microwave Radio Systems", Comm. and Electronics, No. 29, Mar. 1957, p. 67-70.

R. Kitai, "Coherent and Incoherent Detectors", Electronic and Radio Eng. 34, Mar. 1957, p. 96-99.

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2. Laemmel, A. E., CODING PROCESSES FOR BANDWIDTH REDUCTION IN PICTURE TRANSMISSION, Brook Polyt. Inst., Report R-243-251 (1951), Proc. IRE 39 293 (1951) Abstr.
3. Loeb, J., COMMUNICATION THEORY OF TRANSMISSION OF SIMPLE DRAWINGS, Proc. London Symp. (1952)
4. Bell, D. A., ECONOMY OF BANDWIDTH IN TELEVISION, Jour Brit IRE, Vol. 13 (1953) pp 446 - 523, Disc. Vol 13 (1953) pp 590 - 591
5. Kretzner, E. R., REDUNDANCY IN TELEVISION, Bell Labs Record, Vol. 32 (1954) pp 401 - 404
6. Deutsch, S., THE POSSIBILITY OF REDUCED TELEVISION BANDWIDTH, IRE Trans. Vol. BTR-2 (Oct. 1950) pp 69 - 81.
7. Kretzner, E. R., REDUCED ALPHABET REPRESENTATION OF TELEVISION SIGNALS, 1956 IRE Conf. Rec. Part 4, pp 140 - 147.
8. Michel, W. S., Fleckenstein, W. C., Kretzner, E. R., A CODED FACSIMILE SYSTEM, 1957 IRE WESCON Conf Rec. Part 2, pp 84 - 88

## 7.1 General Theory

"Index of Books Reviewed in Science 27 Apr 1956  
through 19 Apr 1957" Science 125, 831-898  
26 Apr 1957.

7.3 Definition, relation with statistical  
mechanics, philosophy

7.4 Correlation, prediction, fullerene storage

Prm 7-1953. See Stumpers Bathog (PGIT-2)

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1955

W.L. Poot and J.S. Pitter "Some Remarks  
on Intellectual Detection MIT Lincoln Lab  
Tech Rep No. 92 10 Aug 1955"

7.6 Speech, Hearing, Vision, Linguistics

(d)

Joseph Ballant "Literature, Science and the  
"Empowerment Crisis" Science 125:787 26 Apr 57.

7.7 (A) Other Biophysical Application  
(Cybernetics and the nervous system)

(a) Human Engineering,

(c) Group Communication

(a)

R.W. Gerard, Clyde Kluckhohn and Anatol Rapoport "Biological and Cultural Evolution: Some Analogies and Exploration" Behavioral Science 1, p 6 Jan 1956

Richard L. Meier "Communication and Social Change" Behavioral Science 7, p 43, Jan 1956

Homer Jacobson "Information, Reproduction and the Organizing Life" Amer Scientist, 1955 p 119-127  
vol 43. Abst Behavioral Science 1, p 81, 1956.

Y.S. Touloukian "The Concept of Entropy in Communication, Living Organism, and Thermodynamics" Purdue Univ. Engin Exp Sta. Bull No. 130

7.9

- (a) Miscellaneous Application
- (b) Optics
- (c) Games
- (d) Servomechanisms

(c) Games

Melvin Drescher "Theory of Games of Strategy"  
Applied Mech. Rev. 10, pp 133-135, Apr 1959

## 7.10 Mathematics

- (a) Statistics — game theory
- (c) Relay Algebra
- (d) Noise Analysis

## (d) Noise Analysis

008.075.612 H.W. Cochrane "The Effect of logical Noise in Transistor Inverted Circuits"

005.110.625 R.A. Barbou "Error Checking for Five-Channel Telegraphic Code"

George R. Cooper "Analysis of Waveforms for a Standard Radio Noise Generator" Purdue Univ. Engin. Exp. Sta. Bull. No. 124 May 1955

SAN JOSE LABORATORY  
ADVANCED SYSTEMS DEVELOPMENT

May 16, 1960

FILE MEMORANDUM: 5720-7.11D

SUBJECT: Bibliography on Error-Detection and Error-Correcting Codes.

1. For a more general class of coding see F. L. Stumpers Bibliographies issued by MIT and the IRE Professional Group on Information Theory. Detailed references are in File Memo: 5720-7.0
2. For a chronological listing restricted in a more narrow sense to error-detecting and error-correcting codes, refer to:

F. B. Wood, "Bibliography on Error-Detecting and Error-Correcting Codes," IBM Report RJ-170, June 11, 1959.

Part I. Public Literature

Part II. Internal IBM reports (Company confidential)

3. For Bibliography of Literature References prepared by Technical Information Service, IBM, Endicott, see:

Bibliography of Literature References on SELF CORRECTING CODES, (Code 01.01), July 30, 1958.

Bibliography of Literature References on COMPUTER CODING (ERROR DETECTION ASPECTS) (Code 01.01), August 13, 1958.

4. For more recent papers on coding, refer to:

Coding Newsletter, No. 60.1, April 1, 1960, issued by A. B. Fontaine, Elec. Engin. Dept., University of Wisconsin, and W. W. Peterson, Elec. Engin. Dept., Massachusetts Institute of Technology.

5. The purpose of this bibliography is to provide a listing of references which may not have been covered by the above three bibliographies, or which have been republished, or which are still IBM Confidential.

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1959

For first part of 1959, see Report RJ-170.

N. M. Abramson, "A Class of Systematic Codes for Non-Independent Errors," IRE Trans. on I.T., Vol. IT-5, No. 4, December, 1959, pp. 150-157.

L. Calabi and H. G. Haefli, "A Class of Primary Systematic Codes Correcting Errors at Random and in Bursts," IRE Trans. on I.T., Vol. IT-5, Special Supplement, May, 1959, pp. 79-94.

Robert Chien, "On the Characteristics of Error-Correcting Codes," IRE Trans. on I.T., Vol. IT-5, No. 2, June, 1959, p. 91.

John Cocke, "Lossless Symbol Coding with Nonprimes," IRE Trans on I.T., Vol. IT-5, No. 1, March, 1959, pp. 33-34.

Philip Fire, "A Class of Multiple Error-Correcting Binary Codes for Non-Independent Errors," Stanford Electronics Laboratories, Technical Report No. 55, April 24, 1959.

Philip Fire, (same paper), Conference Paper, AIEE, Chicago, Oct., 1959.

A. B. Fontaine and W. W. Peterson, "Group Code Equivalence and Optimum Codes," IRE Trans. on I.T., Vol. IT-5, Special Supplement, May, 1959, pp. 60-70.

Wan H. Kim, "Error-Correcting Codes for an Assymmetric Nonbinary Channel," IRE Trans. on I.T., Vol. IT-5, No. 4, Dec., 1959, pp. 188-190.

W. H. Kim and C. V. Freiman, "Single Error-Correcting Codes for Asymmetric Binary Channels," IRE Trans. on I.T., Vol. IT-5, No. 2, June, 1959, pp. 62-66.

W. H. Kim and C. V. Freiman, "Multi-Error Correcting Codes for a Binary Asymmetric Channel," IRE Trans. on I.T., Vol. IT-5, Special Supplement, May, 1959, pp. 71-78.

Jerome Rothstein, "Residues of Binary Numbers Modulo Three," IRE Trans. Electronic Computers, Vol. EC-8, No. 2, June, 1959, p. 229.

Nelson Wax, "On Upper Bounds for Error Detecting and Error Correcting Codes," IRE Trans. on I.T., Vol. IT-5, No. 4, Dec., 1959, pp. 168-174.

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April 1, 1960.

Lists 16 current papers, either published or in process.

J. E. Meggitt, "Error Correcting Codes for Correcting Bursts of Errors,"  
AIEE Paper DP 60-654, May 4, 1960.

## II. IBM INTERNAL REPORTS

1959

See RJ-170 for items up to March 1, 1959.

R. T. Chien, "On Error-Correcting Codes Over a Finite Field," RC-154, Oct., 1959.

A. B. Fontaine, "The Use of a Hamming Code with a Channel that has Dependent Noise," Yorktown Hts., New York, IBM Research Report RC-93, May 1, 1959.

James P. MacDougall, "Error Correction for a Ten-Channel Tape System," Poughkeepsie: IBM Prod. Dev. Lab., Tech. Note TN 00.02045.356, April 27, 1959, (Reliability and Serviceability Bulletin No. 32).

M. P. Marcus, File Memorandum (Endicott) on File Memorandum by J. E. MacDonald, March 19, 1959, Ref. Endicott Coding Study Report, Endicott, Prod. Dev. Lab., April 24, 1959.

M. P. Marcus, G. J. Saxenmeyer, M. Schatzoff, and L. H. Tung, "Coding Study Report," TR 01.01.012, 565, April 30, 1959.

C. M. Melas, "A New Group of Codes for Correction of Dependent Errors in Data Transmission," IBM Report RJ-174, June, 1959.

R. F. Stevens and W. G. Bouricius, "The Heuristic Generation of Large Error Correcting Codes," Yorktown Hts., New York, IBM Research Memorandum, RC-123, August 1, 1959.

7.11 Pulse Modulation  
 Multiplex  
 Coding

References for Block Length for Checking

BIBL.89 p 44 Hamming

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Ra-1 Anthony Palston "Error Detection and Error  
 Correction in Real Time Digital Computers  
 Bell Telephone Laboratories, Whippany, N.J.  
 AF Contract AF 33(600)-21536

## 7.12 Miscellaneous References.

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 Feb 9, 1957. Tape recording of engineering  
 seminars. Engin Lab, Endicott (Repl 673)

## TIS Bibliographies

- 01.07 Production Theory
- 01.08 Operations Research
- 01.09 Creative Engineering
- 03.03 Condenser and Storage Matrices Memory  
 Using Diodes and Capacitors
- 05.11 Transmission of Digital Data over Long Distances
- 05.11 High Speed Electronic Facsimile
- 07.03 Reliability, Computer
- 07.03 Reliability, System
- 08.08 Computer Checking Circuits
- 15.01 Kerr Electro-Optical and Magneto-Optical  
 Effects
- 15.01 Quenching of Phosphorescence by Infrared  
 Radiation
- 15.01 Usage of Reflected Polarized Light in the  
 Measurement of Film Thickness - Ellipsometry.
- 15.07 Thermoelectricity and the Peltier Cooling Effect

- 16.02 Thin Film of Aluminum Oxide
- 16.10 Field Responsive Fluids
- 16.10 Magnetic Field Responsive Fluids
- 19.03 Impulse Storage Devices

Some Selected Russian Translation references:  
(from Morris D. Friedman, Inc.)

Avtomatika i Telemekhanika\*, vol. 17, No. 9, 1956

- I. A. Zakhariia, V. N. Mikhailovskii: On a method of time-pulse transformation. 836  
 Abstract: Properties are analyzed of a new method of transforming the voltages of rectangular pulses in direct proportion to the value of the time segment between the leading fronts of two pulses fulfilling oscillations of heightened frequency. The results of the analysis indicate the possibility of using this method in telemetering systems. \*, vol. 17, No. 9, 1956
- A. A. Fel'DBaum: On the use of computers in automatic systems. 1046  
 Abstract: The paper contains a survey and classification of the directions of using computers in automatic systems. Considered are certain tendencies in the development of automatic systems and also questions related thereto which concern the theory and constructional principles of an automatic system. \* vol. 17, No. 11, 1956.
- IU. D. Farber: On interference-immunity of remote communication channels. 35  
 Abstract: The question is considered of the interference-immunity of signals transmitted over remote communication channels. It is shown that the frequency characteristics of the amplification of a typical compressing device are not optimum in telephone transmission. Simple methods are recommended to raise the interference-immunity of speech signals. Elektrosviaz' \*\*vol. 10, No. 10, 1956
- V. N. Roginskii: On systems of number transmission in automatizing long distance telephone communication.  
 From the editor: A number of questions are touched upon in this paper, which is published as a formulation of the problem, related to automatization of telephone communications between cities. The editors ask specialists to discuss the questions.  
 Considered in the paper are number transmission systems over long distance communication channels. A conclusion is made on the expediency of using multi-frequency coding of all the numbers of the interurban stations in the Soviet Union network. \*\*
- G. F. Pramnek: Automatized re-reception of telegrams with code commutation. 55  
 Abstract: Considered are the basic principles of a system of automatic telegram re-reception by code commutation developed by the TsNIIS. Automatization is provided in the system both for the basic processes or re-reception of telegrams in transit and for a number of auxiliary operations. The control of telegram commutation is carried out by using routing indices placed at the head of each telegram. \*\*

- E. S. Gorbunov: Comparison of certain interference-immune codes 42  
 Abstract: A comparison is made of the interference-immunity and capacity of correcting codes correcting unitary and binary errors and a seven-digit code. It is shown that the seven-digit code is more interference-immune in a system with automatic reference. *Elektrosviaz'*,\* vol. 10, No. 12, 1956
- M. B. Rabinovich: Comparison of transmission stability over a tone telegraph channel with frequency and amplitude modulation 67  
 Abstract: Given are results of comparison test of tone telegraph channels with frequency and with amplitude modulation on compressed overhead lines of great length. \*
- E. L. Blokh, A. A. Kharkevich: To the question of the geometric proof of the Shannon theorem 5  
 Abstract: An attempt to construct, in previous works, a geometric proof of the theorem on the capacity led to a divergence from the well-known result of Shannon. Further investigation has shown that the reason for this divergence is the use of an incorrect geometric model; the questions related thereto are explained in this paper. *Radiotekhnika\*\**, vol. 11, No. 11, 1956
- L. I. Kastal'skii: To the question of generating bell-shaped pulses 73  
 Abstract: Described herein is one of the circuits to generate bell-shaped pulses as well as results of its experimental verification. \*\* vol. 12, No. 1, 1957
- IA. I. Likhter: On certain statistical properties of atmospheric radio noise. 1296  
 Abstract: Results are cited of an experimental investigation of the statistical properties of atmospheric noise. It is shown that the distribution of atmospheric noise is not normal and that the distribution function depends on several parameters. *Radiotekhnika i Elektronika*, vol. 1, No. 10, 1956
- K. Urbanik: Random processes whose realizations are generalized functions (English summary) 146  
 Theory of Probability and its Applications, vol. 1, No. 1, 1956

- a. E.G. Newman and L.O. Nippe "Simulation of an Information Channel on the IBM 704 Computer"  
IBM Poughkeepsie PDL June 10, 1958
- b. L.O. Nippe "High Density Tape Channel Simulation Study" (1957)
- c. Report No. 1. "Initialize Routine Feasibility Study for Magnetic Tape Error Code Analysis" (1957)
- d. Report No. 2 L.O. Nippe "Feasibility Study for Magnetic Tape Error Code Analysis" (1957) -  
Uses Samuel Code: Double-error-correction, diagonally-checked code, 18 information bits  
4 parity check tracks.

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 "A High ~~Speed~~ Volume, High Speed Weather  
 Information Distribution System"
- Michel "Statistical Encoding for Teletext Pictures  
 Communication" Com & Elect Mar 1958 p 33  
 (AIEE 57-723)
- Boughtwood Christ "Data Transmission Error  
 Rate" Com & Elect Mar 1958 p 101  
 (AIEE 58-172)
- Schubert "Matrix Analysis of Logical Networks"  
Com & Elect Mar 58, p 100
- Yeh "Communication in Space" Elec. Ind  
 Feb 59, p. 54
- Rector "Space Age Computation" Datacom Mar/Apr  
 1959, p 8
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 Asymmetric Binary Channels" IRE Trans Inf Theory  
 Vol IT-5, No. 2, June 1959, p 62
- Chien "On the Characteristics of Error-Correcting Codes"  
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SAN JOSE LABORATORY  
ADVANCED SYSTEMS DEVELOPMENT

April 7, 1960

FILE MEMORANDUM: 5720-7.13A

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