

## Section 16

# COMMUNICATIONS

This section presents statistics on the usage, finances, and operations of the various communications media: postal service, telephone, telegraph, radio, television, newspapers and periodicals, and books. Sections 12 and 15 contain employment and payrolls data for communications establishments.

Hawaii is served by all major communications media. In 1984 it had 130 post offices and stations handling 317 million pieces of mail and accounting for postal receipts in excess of \$84 million. There were 472,000 telephone access lines in service, 339,000 telephone homes, about 2.1 billion local calls originated, 12 million completed interisland calls (in 1981), and 32 million incoming and outgoing transpacific calls (in 1980). Telegraph messages to and from Hawaii in 1983 totaled 146,000. The 45 commercial, public and educational radio stations in the Islands in 1985 included 26 on the regular broadcast band and 19 FM stations. The State also had 15 television stations (13 commercial and 2 public), including satellites but excluding translators. Ten cable TV companies served 211,000 subscribers. An estimated 97 percent of all households in the State had television sets, and the average prime-time TV audience in February 1985 numbered 187,000 households. Island publishers printed nine daily newspapers, numerous magazines and other periodicals, and a wide diversity of books. Newspaper circulation reported by the two English-language dailies on Oahu averaged 197,000 in 1984-1985.

The major sources for statistics on communications are the reports and records of the U.S. Postal Service, Federal Communications Commission, Division of Consumer Advocacy and CATV Division of the Hawaii State Department of Commerce and Consumer Affairs, Hawaiian Telephone Company, Audit Bureau of Circulations, A. C. Nielsen Co., and Hawaii Media Guide. Earlier figures appear in Historical Statistics of Hawaii, Section 18. Data on communications for other States and for the nation as a whole are carried in Statistical Abstract of the United States: 1985, Section 19.

Table 423.-- POSTAL SERVICE: 1970 TO 1985

[For fiscal years ended June 30 through 1976 and September 30 thereafter]

Fiscal year	Number, end of fiscal year <u>1/</u>		Gross postal receipts (\$1,000)	Pieces of mail <u>2/</u> (millions)
	Post offices	Stations		
1970 .....	80	...	20,840	187
1971 .....	80	...	21,976	201
1972 .....	78	...	23,434	215
1973 .....	77	...	27,100	226
1974 .....	76	...	29,663	233
1975 .....	76	...	33,549	238
1976 .....	76	...	37,433	242
1977 .....	76	...	43,790	249
1978 .....	76	...	49,198	267
1979 .....	76	...	55,267	276
1980 .....	76	...	58,413	298
1981 .....	76	...	67,055	293
1982 .....	76	...	77,424	290
1983 .....	76	<u>3/</u> 50	80,943	305
1984 .....	76	<u>4/</u> 54	84,733	317
1985 .....	76	64	94,975	339

1/ Includes all 1st-, 2nd-, 3rd-, and 4th-class post offices and both classified and contract stations (classified stations are those staffed by career postal employees; contract stations, those operated under a contractual agreement between the Postal Service and an individual contractor). Station counts not available before 1983. As of September 30, 1985, Hawaii had 32 1st class offices, 28 2nd class offices, 16 3rd class offices, no 4th class offices, 29 classified stations, and 35 contract stations.

2/ Originating in Hawaii. Mail originating elsewhere is excluded.

3/ April 15.

4/ June 30.

Source: U.S. Postal Service, Pacific District, Honolulu, records.

Table 424.-- NUMBER OF POST OFFICES AND STATIONS, BY ISLANDS:  
JUNE 30, 1985

Island	Total	Post offices <u>1/</u>			Stations	
		1st class	2nd class	3rd class	Classified <u>2/</u>	Contract <u>3/</u>
State total ..	137	27	30	19	29	32
Hawaii .....	35	7	11	10	2	5
Maui .....	17	6	4	-	2	5
Lanai .....	1	-	1	-	-	-
Molokai .....	5	-	1	4	-	-
Oahu .....	59	11	5	1	24	18
Kauai .....	20	3	8	4	1	4
Niihau .....	-	-	-	-	-	-

1/ There are no fourth-class post offices in the State.

2/ Staffed by career postal employees.

3/ Operated under a contractual agreement between the Postal Service and an individual contractor.

Source: U.S. Postal Service, Honolulu, Address Information Systems, data supplied July 2, 1985.

Table 425.-- U.S. POSTAL SERVICE EMPLOYMENT,  
BY SEX: 1970 AND 1980

Year	Both sexes	Male	Female
1970 .....	2,073	1,662	411
1980 .....	2,220	1,749	471

Source: U.S. Bureau of the Census, 1980 Census of Population, Detailed Population Characteristics, Hawaii, PC80-1-D13 (October 1983), p. 321.

Table 426.-- STATISTICAL SUMMARY FOR SPECIFIED ZIP CODE AREAS:  
1980 AND 1985

[All addresses in the United States are identified geographically, for postal purposes, according to ZIP Code areas. This table presents data for representative areas. Comparable statistics for other ZIP Code areas in Hawaii, and a map of ZIP Code areas on Oahu, appear in the report cited in the source reference]

Subject	State total	Specified Zip Code areas			
		Downtown Honolulu 96813	Waikiki 96815	Kailua 96734	Hilo 96720
1985:					
Residences .....	291,766	7,115	20,824	14,204	12,718
P.O. boxes <sup>1/</sup> .....	73,820	543	-	1,558	846
Businesses .....	25,243	3,956	1,707	694	1,606
1980:					
Population .....	964,691	17,612	31,123	47,705	38,537
Households .....	294,934	6,941	15,516	13,992	12,226
Median age (years) .....	28.4	33.2	39.6	27.7	29.0
Race: Percent Japanese .....	24.9	30.9	24.9	13.5	37.1
Persons per household .....	3.15	2.51	2.06	3.39	3.07
Percent foreign born .....	14.2	15.3	19.9	6.1	7.4
Percent different house in 1975 .....	50.7	49.8	57.9	51.0	48.0
Persons 25 years and over:					
Percent high school graduates .....	73.8	70.9	79.2	84.2	71.3
Civilian labor force: Percent unemployed .....	4.7	4.6	4.7	4.4	6.4
Median household income (dollars) .....	20,473	17,630	16,292	25,825	18,050
Housing units:					
Number .....	334,235	7,317	24,556	14,456	12,807
Percent in 1-unit structures .....	51.7	32.7	9.0	74.7	75.2
Percent vacant .....	11.4	5.2	36.7	3.5	4.9
Renter occupied units:					
Percent of occupied units ....	48.3	60.0	64.7	37.3	40.1
Median rent (dollars) .....	271	297	339	366	261

<sup>1/</sup> Excludes 16,245 Post Office boxes in ZIP codes unassigned in the 1980 Census.

Source: Hawaii State Census Statistical Areas Committee, Characteristics of ZIP Code Areas, 1980 (Report CTC-62, May 28, 1985).

Table 427.-- TELEGRAPH MESSAGES: 1973 TO 1983

Year	Total messages	From Hawaii to Mainland			From Mainland to Hawaii		
		Total from Hawaii	Originated in Hawaii	Originated elsewhere	Total to Hawaii	Originated on Mainland	Originated elsewhere
1973 ..	385,823	187,130	116,850	70,280	198,693	136,747	61,946
1974 ..	382,281	185,204	100,321	84,883	197,077	125,319	71,758
1975 ..	346,851	166,700	81,986	84,714	180,151	110,390	69,761
1976 ..	307,036	156,235	70,692	85,543	150,801	80,638	70,163
1977 ..	277,748	142,903	61,512	81,391	134,845	70,826	64,019
1978 ..	271,747	137,687	54,505	83,182	134,060	69,055	65,005
1979 ..	262,888	134,265	50,522	83,743	128,623	65,598	63,025
1980 ..	222,410	120,785	43,543	77,242	101,625	46,564	55,061
1981 ..	196,350	106,248	34,432	71,816	90,102	37,924	52,178
1982 ..	168,501	88,325	27,951	60,374	80,176	31,227	48,949
1983 ..	145,990	71,428	21,739	49,689	74,562	21,777	52,785

Source: Federal Communications Commission, Common Carrier Bureau, data provided February 12, 1985.

Table 428.-- TELEPHONE ACCESS LINES, BY ISLAND AND TYPE: 1981 TO 1984

[As of December 31. Access lines represent the lines connecting customers to the network regardless of the ownership of the customer premises equipment. Business access includes key and coin system lines]

Year	All access lines	By island		By type		
		Oahu	Other islands	Residence	Business	Other types
1981 ....	431,893	324,968	106,925	314,355	95,000	22,538
1982 ....	445,452	334,150	111,302	323,588	98,691	23,173
1983 ....	458,339	342,094	116,245	332,051	102,923	23,365
1984 ....	472,229	348,936	123,293	339,296	107,830	25,103

Source: Hawaiian Telephone Company, data provided February 27, 1985.

Table 429.-- TELEPHONES IN SERVICE AND RESIDENCE  
MAIN STATIONS: 1971 TO 1981

[As of December 31. Data limited to the Hawaiian Telephone Company. Because of deregulation of the telephone industry, the series reported in this table after 1981 no longer included all or almost all of the telephones in Hawaii, and moreover became subject to disclosure rules that precluded their publication for subsequent years]

Year	Telephones in service			Residence main stations
	State total	Oahu	Other islands	
1971 .....	445,995	365,733	80,262	212,983
1972 .....	498,593	412,443	86,150	221,277
1973 .....	523,699	430,612	93,087	231,146
1974 .....	544,718	444,359	100,359	239,923
1975 .....	567,685	460,602	107,083	250,319
1976 .....	596,952	480,937	116,015	262,982
1977 .....	627,848	501,914	125,934	273,860
1978 .....	659,141	523,472	135,669	285,948
1979 .....	684,812	539,582	145,230	296,433
1980 .....	712,095	555,790	156,305	303,928
1981 .....	728,352	563,630	164,722	311,430

Source: Hawaiian Telephone Company, records, for 1971 through 1980; Hawaii State Department of Commerce and Consumer Affairs, Division of Consumer Advocacy, records, for 1981.

Table 430.-- TELEPHONE CALLS: 1974 TO 1984

[In thousands]

Year	Local <u>1/</u>		Interisland <u>2/</u>		Transpacific (paid) <u>2/</u>	
	Originating	Completed	Paid <u>3/</u>	Completed	Outgoing	Incoming and outgoing <u>4/</u>
1974 .....	1,438,381	949,332	4,494	4,564	4,775	8,620
1975 .....	1,395,876	918,486	5,156	5,352	5,908	10,703
1976 .....	1,517,337	1,012,064	5,851	6,140	7,448	13,621
1977 .....	1,566,869	1,052,936	6,838	7,028	9,485	17,103
1978 .....	1,719,200	1,139,829	8,087	8,317	12,232	22,540
1979 .....	1,830,954	1,186,458	9,635	10,040	15,160	28,076
1980 .....	1,957,427	1,468,070	10,652	11,239	17,199	31,609
1981 .....	1,857,938	1,393,454	11,316	11,993	(NA)	(NA)
1982 .....	1,892,430	1,419,322	(NA)	(NA)	(NA)	(NA)
1983 .....	1,928,486	1,446,365	(NA)	(NA)	(NA)	(NA)
1984 .....	2,050,664	1,537,998	(NA)	(NA)	(NA)	(NA)

NA Not available.

1/ The number of local calls is affected as central offices are being converted to Electronic Common Control (ECC). ECC records call attempts after the first digit is dialed. Non-ECC offices record the call attempts when the handset is lifted. Also significant in 1981 were an estimated 17 million fewer calls due to the implementation of Directory Assistance Charging. Because of these fundamental changes in data collection, more recent figures are not comparable to earlier years.

2/ As a result of deregulation of the telephone industry, these series became subject to disclosure rules after 1980 or 1981, and regular publication of annual data was discontinued.

3/ Excludes uncollectables.

4/ Includes calls paid in Hawaii and elsewhere.

Source: Hawaiian Telephone Company, records; Hawaii State Department of Commerce and Consumer Affairs, Division of Consumer Advocacy, records.

Table 431.-- TELEPHONE SERVICE, BY ISLANDS: 1981

[As a result of deregulation of the telephone industry, the series shown in this table became subject to disclosure rules after 1981, and regular publication of annual data was discontinued]

Island	Tele- phones in service, Dec. 31	Main stations, Dec. 31		Inter- island calls <u>1/</u>
		Residence	Business	
State total ..	728,352	311,430	81,499	11,992,843
Oahu .....	563,630	241,261	62,304	5,539,848
DATS <u>2/</u> .....	27,676	-	12,497	...
Other Oahu .....	535,954	241,261	49,807	...
Other islands .....	164,722	70,169	19,195	6,452,995
Hawaii .....	70,183	30,735	8,440	2,698,799
Maui .....	58,875	24,225	6,524	2,384,111
Lanai .....	916	646	103	...
Molokai .....	3,652	1,759	440	...
Kauai .....	31,096	12,804	3,688	1,370,085

1/ Number completed, by island of origination. Oahu total includes Lanai and Molokai.

2/ Defense Administrative Telephone System.

Source: Hawaii State Department of Commerce and Consumer Affairs, Division of Consumer Advocacy, records.



Table 432.-- COMMERCIAL AND NON-COMMERCIAL RADIO AND TELEVISION  
BROADCASTING STATIONS IN OPERATION: 1925 TO 1985

Date	Commercial stations			Non-commercial stations		
	AM	FM	TV <u>1/</u>	AM	FM	TV <u>1/</u>
1925: Jan. 1 .....	2	-	-	-	-	-
1940: Jan. 1 .....	3	-	-	-	-	-
1955: Jan. 1 .....	13	1	3	-	1	-
1970: Jan. 1 .....	25	4	10	-	1	2
1985: June 30 .....	26	17	13	-	2	2

1/ Excluding translators and cable television.

Source: Federal Communications Commission, records.

Table 433.-- COMMERCIAL AND NON-COMMERCIAL RADIO AND TELEVISION  
BROADCASTING STATIONS IN OPERATION: JUNE 30, 1985

County	Commercial stations			Non-commercial stations		
	AM <u>1/</u>	FM	TV <u>2/</u>	AM	FM	TV <u>2/</u>
State total ..	26	17	13	-	2	2
Hawaii .....	4	3	4	-	-	-
Maui .....	3	6	3	-	-	1
Honolulu .....	17	7	6	-	2	1
Kauai .....	2	1	-	-	-	-

1/ Station KAIM, with studios on Oahu but transmitter on Molokai, is included with the Honolulu total.

2/ Includes satellites but excludes translators and cable television.

Source: Federal Communications Commission, Field Operations Bureau, Honolulu, July 11, 1985.

Table 434.-- CABLE TELEVISION COMPANIES, SUBSCRIBERS, AND REVENUES,  
BY COUNTIES: 1983 AND 1984

County	Number of companies Dec. 31 <sup>1/</sup>		Subscribers, Dec. 31		Gross revenue <sup>2/</sup> (\$1,000)	
	1983	1984	1983	1984	1983	1984
State total	10	9	187,966	210,527	22,101	24,919
Hawaii .....	3	3	17,528	17,701	2,343	2,450
Maui .....	2	2	16,007	18,180	1,757	2,218
Honolulu .....	4	3	148,649	167,216	16,898	18,658
Kauai .....	2	2	5,782	7,430	1,103	1,594

<sup>1/</sup> State totals are unduplicated figures; one company provided service to both Hawaii and Maui Counties.

<sup>2/</sup> Basic service only.

Source: Hawaii State Department of Commerce and Consumer Affairs, Cable Television Division, records.

Table 435.-- TELEVISION HOUSEHOLDS: 1973 TO 1985

Date	Total households	Television households	
		Number	Percent
September 1973 .....	230,500	220,110	95.5
September 1974 .....	243,300	233,290	95.9
September 1975 .....	245,400	236,150	96.2
September 1976 .....	252,900	243,380	96.2
September 1977 .....	267,100	257,400	96.4
September 1978 .....	270,400	261,170	96.6
January 1980 .....	273,800	265,250	96.9
January 1981 <sup>1/</sup> .....	302,500	293,500	97.0
January 1982 .....	310,700	300,560	96.7
January 1983 .....	320,800	310,310	96.7
January 1984 .....	324,100	313,470	96.7
January 1985 .....	334,700	323,720	96.7

<sup>1/</sup> Reflects effect of revision incorporating 1980 Census data.

Source follows next table.

Table 436.-- HOUSEHOLDS AND PERSONS VIEWING TELEVISION BY TIME OF DAY:  
1974 TO 1985

[In thousands. Mean number of viewers, Sunday through Saturday]

Year and month	Sign-on to sign-off 7 A.M. to 1 A.M.		Prime time 6:30 P.M. to 10 P.M.	
	Households <u>1/</u>	Persons <u>2/</u>	Households <u>1/</u>	Persons <u>2/</u>
1974: May .....	59	106	134	279
Nov. ....	74	121	156	317
1975: Feb. ....	70	121	162	328
May .....	64	110	143	294
Nov. ....	76	123	159	321
1976: Feb. ....	73	133	166	343
May .....	69	117	149	290
Nov. ....	75	129	159	309
1977: Feb. ....	73	125	163	324
May .....	69	121	153	312
Nov. ....	80	145	163	332
1978: Feb. ....	75	136	167	344
May .....	70	127	153	301
Nov. ....	82	103	<u>3/</u> 171	<u>3/</u> 250
1979: Feb. ....	79	100	168	340
May .....	77	96	159	313
Nov. <u>4/</u> .	...	...	...	...
1980: Feb. ....	78	105	169	258
May .....	74	101	156	240
Nov. ....	73	128	150	300
1981: Feb. ....	75	134	158	319
May .....	79	137	164	320
Nov. ....	85	146	165	327
1982: Feb. ....	81	139	166	327
May .....	75	129	148	293
Nov. ....	84	142	174	335
1983: Feb. ....	86	147	182	357
May .....	85	142	174	330
Nov. ....	88	147	176	334
1984: Feb. ....	86	149	182	354
May .....	82	139	163	317
Nov. ....	93	158	188	357
1985: Feb. ....	90	150	187	360
May .....	87	143	175	332

1/ Average number with a TV set turned on.

2/ Average number of persons, 2 years and older, in TV households that are viewing any station.

3/ Reported only for 7:00 p.m. to 10:00 p.m.

4/ Records missing.

Source: Nielsen Station Index, Honolulu, Hawaii, issued three times annually.

Table 437.-- AVERAGE PAID CIRCULATION OF DAILY AND SUNDAY ENGLISH-LANGUAGE NEWSPAPERS: 1981-82 TO 1984-85

[Averages for 12-month periods ended in March. Foreign-language daily newspapers, not included in this table, are the Hawaii Hochi, Japanese and English; The Korean Times and Han Kook Ilbo, Korean; and United Chinese Press, Chinese]

Newspaper	1981-82	1982-83	1983-84	1984-85
<b>Daily:</b>				
Honolulu Advertiser <u>1/</u> .....	83,825	84,882	85,593	86,998
Honolulu Star-Bulletin <u>2/</u> .....	112,011	112,912	111,825	110,045
Hawaii Tribune-Herald (Hilo) <u>3/</u> .....	18,912	19,103	19,438	19,868
West Hawaii Today (Kailua-Kona) <u>4/</u> ..	6,804	6,599	6,762	7,138
Maui News (Wailuku) <u>5/</u> .....	13,965	14,323	15,468	15,983
Garden Island (Lihue) <u>6/</u> .....	9,348	9,363	9,649	9,550
<b>Sunday morning:</b>				
Sunday Star-Bulletin and Advertiser .	197,135	197,142	197,793	198,184
Hawaii Tribune-Herald (Hilo) .....	20,531	21,094	21,892	22,605
West Hawaii Today (Kailua-Kona) <u>7/</u> ..	...	...	...	6,626
Maui News (Wailuku) <u>8/</u> .....	...	...	...	14,668
Garden Island (Lihue) <u>9/</u> .....	...	...	...	8,900

1/ Mornings, Monday through Saturday.

2/ Afternoons, Monday through Saturday.

3/ Afternoons, Monday through Friday.

4/ Mornings, 3 times weekly, through February 1982, and 5 times weekly, Monday through Friday, beginning March 1, 1982.

5/ Afternoons, Monday through Friday. Figure for 1981-1982 refers to 6-month period ended March 31, 1982.

6/ Afternoons, 4 times weekly (Monday, Wednesday, Thursday, and Friday, April 1, 1981 to February 14, 1982; Monday, Tuesday, Wednesday, and Friday, beginning February 15, 1982).

7/ Beginning April 29, 1984.

8/ Beginning September 1984.

9/ Beginning July 1, 1984.

Source: Audit Bureau of Circulations data provided to DPED by newspaper publishers.

Table 438.-- PERIODICALS PUBLISHED IN HAWAII: 1985

Frequency	Newspapers		Magazines and other periodicals <u>1/</u>
	English	Foreign language	
Daily, 5 to 7 times weekly ...	6	3	-
2 to 4 times weekly .....	-	-	1
Weekly .....	9	1	15
Semi-monthly or biweekly .....	3	3	18
Monthly .....	2	-	53
1 to 10 times annually .....	-	-	40

1/ Includes regularly published magazines, company and in-house publications, labor publications, educational publications, military and federal publications, and special interest publications. Does not include publications that are updated as required, or other irregular publications. Not comparable to previous years' data.

Source: Aloha United Way, Hawaii Media Guide, April 1985.

Table 439.-- BOOKS AND SCHOLARLY JOURNALS PUBLISHED BY THE UNIVERSITY OF HAWAII PRESS: 1982 TO 1984

[The University Press of Hawaii was renamed the University of Hawaii Press in 1982]

Year	Published titles <u>1/</u>		New books and journals published <u>2/</u>		Volumes sold <u>2/</u>	Sales revenues <u>2/</u> (dollars)
	Cumulative total	In print	Books	Scholarly journals		
1982 ....	648	499	29	7	196,093	888,504
1983 ....	669	525	22	7	197,981	1,510,885
1984 ....	716	552	38	9	233,859	1,634,180

1/ As of June 30.

2/ Year ended June 30.

Source: The University of Hawaii Press, information provided February 12, 1985.

Table 440.-- POSTAGE RATES AND NEWSPAPER PRICES, FOR  
HONOLULU: 1975 TO 1985

[In cents. As of July 1]

Year	Domestic first-class postage rates			Newspaper price <sup>1/</sup>	
	Letters		Postal and post cards	Daily	Sunday
	First ounce	Each added ounce			
1975 ....	10	10	8	20	50
1976 ....	13	11	9	20	50
1977 ....	13	11	9	20	50
1978 ....	15	13	10	20	50
1979 ....	15	13	10	25	60
1980 ....	15	13	10	25	60
1981 ....	18	17	12	25	75
1982 ....	20	17	13	25	100
1983 ....	20	17	13	25	100
1984 ....	20	17	13	25	100
1985 ....	22	17	14	35	100

<sup>1/</sup> Street sales, for the Honolulu Advertiser,  
Honolulu Star-Bulletin, and Sunday Star-Bulletin and  
Advertiser.

Source: Postal rates from Statistical Abstract of  
the United States: 1985, p. 541, as updated.  
Newspaper rates from nameplates.

Table 441.-- HAWAIIAN TELEPHONE COMPANY RATES FOR SPECIFIED TYPES OF SERVICE, FOR HONOLULU: 1975 TO 1985

[In dollars. As of July 1. Including federal excise tax where applicable]

Year	Local call, pay phone	Honolulu to Hilo		Honolulu to California		Monthly charge, indiv. res. line <u>3/</u>
		Direct dialing <u>1/</u>	Through operator <u>2/</u>	Direct dialing <u>1/</u>	Through operator <u>2/</u>	
1975 ..	0.10	0.96	0.96	2.57	3.37	10.17
1976 ..	0.10	0.95	0.95	2.39	3.34	10.07
1977 ..	0.10	0.94	0.94	1.86	2.84	9.98
1978 ..	0.15	0.94	0.94	1.84	2.81	11.86
1979 ..	0.15	0.90	0.90	1.61	2.55	11.74
1980 ..	0.15	1.06	1.89	1.64	2.60	11.63
1981 ..	0.15	1.06	1.89	1.64	2.60	11.63
1982 ..	0.15	1.05	1.87	1.74	2.63	11.51
1983 ..	0.15	1.07	1.91	1.77	3.37	11.31
1984 ..	0.15	1.07	1.91	1.66	3.25	11.74
1985 ..	0.15	1.14	2.06	1.54	3.13	12.77

1/ Daytime calls, first three minutes.

2/ Station-to-station operator-handled daytime weekday calls, first three minutes.

3/ Telephone rental included through February 5, 1983, and excluded thereafter. In 1985, the monthly rental charge for a standard desk-top telephone was \$1.85. On June 1, 1985, a federal subscriber line charge of \$1.00 was added to monthly service bill.

Source: Hawaiian Telephone Company, records, and American Telephone & Telegraph, records.