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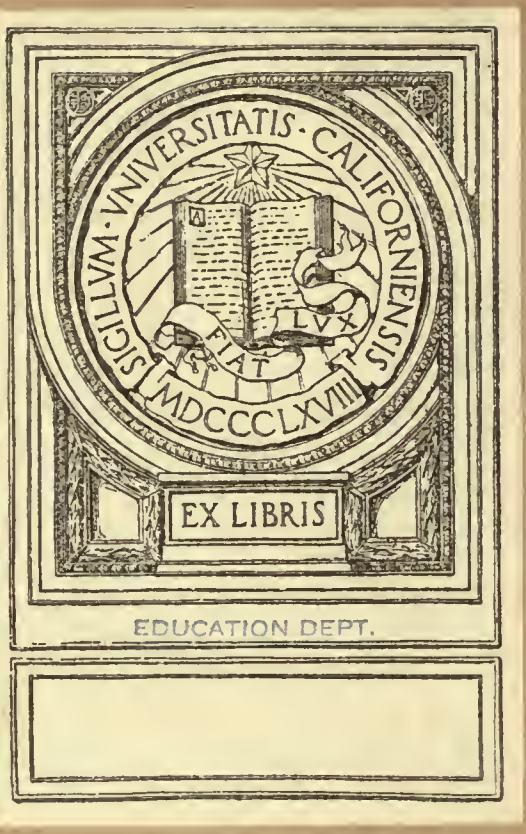
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The Use of the High School Plant: a Study of the East Bay High Schools

By

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THESIS

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It has been generally understood that the recent increase in the school enrollment in the East Bay cities has resulted in a more or less serious overcrowding in the high schools of these cities. However, this fact has largely been taken for granted, since no definite information as to the degree of overcrowding has been available. No objective standards have been applied to measurement of the percentage of use of available facilities made by the high schools. Moreover, no attempt has been made to discover whether there may not be causes for such overcrowding as may exist, other than simply that of the increase in enrollment.

Purpose of the Study

This study was made for the purpose of determining specifically the percentage of actual use of the various groups of rooms that comprise a high school plant, and to determine, if possible, some of the causes, other than the increase in school enrollment, contributing to such overcrowded conditions as may be found to exist. The schools chosen were as follows: Alameda High School, Berkeley High School, Fremont High School, Oakland High School, Piedmont High School, and Technical High School and University High School of Oakland.

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The Method Used in Measuring the Percentage of Use

In order to determine the percentage of use of the available facilities of these high schools, tabulations were made showing for each room in each of these plants: (1), the size of the room; (2), the capacity in terms of standard requirements, where such are established; (3), the number of seats or student accomodations actually in the room; and (4), the number of students occupying the room at each period of the day. Since the great majority of high school subjects are scheduled for the same periods each day of the week, the program for any one day is sufficient for the purpose of this study. In the few cases where the subject was not given every day of the week, the weekly total was obtained and divided by five, in order to determine the average number of students using the room per day. Floor areas were taken by actual measurement, seatings were taken by actual count or from office records, and the number of pupils for each period was taken from the office records for the Spring Term, 1922.

The facts are therefore as reliable as the information recorded in the various principals' offices, and may be considered accurate enough for all practical purposes. As the programs of the students are constantly changing, it is of course impossible to determine the period enrollment for each day in the term. However the data

from the various schools was compiled after the Spring Term was well under way and may be considered as representing an average day throughout the term.

Basis of Computing Various Measures

In computing the percentage of use of any single room, in order that each school might be fairly judged, the basis taken for each school was the number of periods per day in each school.

Computing Percentage of Use

As an illustration of the method of calculating the percentage of use of the various rooms, let us consider the case of room 21, Alameda High School. The original tabulation sheet shows this room to have an area of 737 square feet, sufficient to accomodate 49 students at 15 square feet per student.* It actually provides seats for 48. Out of a possible use of nine periods the room is used for eight periods. Eight-ninths equals .88 or 88 per cent use in terms of the room being occupied regardless of the size of the class involved. The tabulation further shows that, with the possibility

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*Strayer, G. D., and Englehardt, N. L., Bulletin of Standards for City School Buildings, Bureau of Publications, Teachers College, Columbia University, N. Y. C.

of seating 48 pupils each period for nine periods, or a total of 432, room 21 actually seats 233 per day. Then 233/432 .54 or 54 per cent of use in terms of seats actually provided. Applying the same principle, using the maximum capacity of the room according to standard, or 49 instead of 48, we get 233/9 x 49 .53 or 53 per cent of use in terms of maximum possible use. These data are presented in condensed form in Table I-A for the Alameda High School, and show Room 21 to have an actual capacity of 48, a possible capacity of 49, a percent of use of available area of 53, a percent of use of seats provided of 54, and a percent of use in terms of periods occupied of 88.

Classification of Rooms

In presenting the data in tabular form, the rooms were grouped as nearly as possible upon the basis of the functions served. Recitation rooms were considered as a group; while all other rooms were considered as a second group and listed under the headings descriptive of their use, as laboratories, shops, etc.; or as individual rooms when they could not be included within one of these groups. In many cases the particular use to which the room is devoted is attached to the number of the room.

Arrangement of Tables

The facts concerning the percentage of use of the available areas and accomodations, are presented in separate tables for each school. These tables are as follow:

1. Table I, presenting data on Classroom Group.
2. Table II, giving a Frequency Distribution for Table I.
3. Table III, presenting data for Special Rooms, or rooms other than classrooms.
4. Table IV, giving a Frequency Distribution for Table III.

In order to simplify the method of presentation, the tables for each school bear a letter signifying the name of the school for which the table is constructed. For example, Table I-A presents the data on the classroom group of the Alameda High School. Table II-A gives the frequency distribution for Table I-A, Table III-A presents the data for the special rooms of the Alameda High School, while Table IV-A gives the frequency distribution for Table III-A. The various schools are designated by letter as follows:

(1) A - Alameda High School

(2) B - Berkeley High School

(3) F - Fremont High School

(4) O - Oakland High School

(5) P - Piedmont High School

(6) T - Technical High School

(7) U - University High School

Alameda High School

Table I-A shows 16 classrooms with seating capacities and percentage of use over a nine period day, (computed on available area), seats occupied, and room occupied. For example, Room 21 is working up to 53 per cent of its capacity in terms of available area, 54 per cent in terms of seats occupied throughout the day, and 86 per cent in terms of the room being occupied. Similar facts are shown for each of the other rooms. At the bottom of the table are found the total number of seats possible, (based on the Strayer-Englehardt standard), and the total number of seats provided, as well as the average percentage of use of the group of classrooms. This average percentage indicates that the Alameda High School uses 52 per cent of its possible classroom area, 61 per cent of the seats provided, and 75.8 per cent, practically 76 per cent, in terms of time the rooms are occupied.

Table II-A shows the number of rooms falling within each percentage interval of 10 from 0 to 100 for each basis of calculation, and reads thus: In terms of the three bases for judgment no rooms are working under 10 per cent; in terms of seats occupied,

(4) A — Statement about element

(5) $\forall x$ — Statement about element

none under 20 per cent; in terms of room occupied, noen are working under 30 per cent, and only one under 70 per cent. The significant fact in this table is that the majority or rooms are working over 50 per cent in use of available area, in use of seats, and over 80 per cent in use of periods occupied.

In terms of seats occupied the majority of cases range around 50 per cent, while in terms of room occupied (Column 3) the majority of cases fall between 60 and 100 per cent. While the percentage of use of special rooms, as shown by the Frequency Distribution of Table III-A, is not as high as that of the classrooms as shown by the Frequency Distribution of Table II-A, nevertheless it is worthy of note that the average percentage of use is above 50 per cent. It is well to keep in mind the fact that 100 per cent use means using every seat or student accomodation for each period of the day, a situation hardly possible in view of the fact that the student selects his course arbitrarily and is not assigned to subjects in order to keep each seat occupied all the time.

Table III-A gives the same kind of data concerning laboratories, shops, commercial rooms, drawing rooms, and miscellaneous special rooms that Table I gives for classrooms; except that in Column 1 capacity is given in square feet and not reduced to student accomodation. This is due to the fact that no standards are

available for these various types of rooms. The areas do not figure in per cent under Column 3 because of this fact. Wherever several special rooms used for a similar purpose are listed they are grouped under a common head and the average per cent of use on the three bases determined. Of these groups the drawing rooms stand highest.

Table IV-A gives the Frequency Distribution for Table III-A.

TABLE I-A

SIXTEEN RECITATION ROOMS OF THE ALAMEDA HIGH SCHOOL SHOWING: (1) CAPACITY OF EACH FIGURED ON AVAILABLE AREA, (2) CAPACITY FIGURED ON SEATS PROVIDED, (3) PERCENTAGE OF USE FIGURED ON (a) AREA, (b) SEATS, (c) ROOM OCCUPIED

Room Number	(1) Figured on area	(2) Figured on seats prov.	(3) Percentage of Use in terms of (a) Available area	(b) Occupied seats	(c) Room occupied
21	49	48	53	54	88
22	45	39	65	75	100
23	58	54	43	47	88
24	24	18	17	23	33
25	43	38	70	79	100
26	46	44	47	49	88
27	49	35	50	70	100
16	46	40	66	76	100
15	50	39	55	70	88
14	49	46	54	57	88
2	54	46	28	33	66
43	44	32	56	77	88
42	44	32	55	76	88
55	44	32	63	86	89
45	47	41	40	46	77
52	32	35	63	57	77
Total	724	623	Av. [illegible]	Av. 61%	Av. 75.8%

TABLE II-A

FREQUENCY DISTRIBUTION SHOWING NUMBER OF CLASSROOMS AT EACH INTERVAL FOR EACH OF THE THREE BASES OF COMPUTING PERCENTAGE OF USE.

1	2	3	4
Interval	Available Area: No. of rooms	Seats Occupied: No. of rooms	Room Occupied: No. of rooms
0-10%	0	0	0
11-20	1	0	0
21-30	1	1	0
31-40	1	1	1
41-50	3	3	0
51-60	5	3	0
61-70	5	2	1
71-80	0	5	2
81-90	0	1	8
91-100	0	0	4

TABLE III-A

SEVENTEEN SPECIAL ROOMS SHOWING:
(1) AREA IN SQUARE FEET, (2) CAPACITY FIGURED ON STUDENT ACCOMMODATIONS ACTUALLY PROVIDED, (3), PERCENTAGE OF USE FIGURED ON (a) STUDENT PROVISION. (b) ROOMS OCCUPIED

	Capacity		(3) Percentage of Use in terms of	
	(1)	(2)	(a)	(b)
Room No.-Use:	Area in sq.ft.:	Seats prov. :	Student Provision:	Room Occupied:
Laboratories:				
3 Physics	1092	33	57	44
1 Chemistry	636	27	50	50
46 Biology	925	54	32	66
		T. 114	Av. 46%	Av.53%
Shops				
51 Man. Tr.	1666	24	50	44
53 Forge	1178	16	44	47
57 Auto	3000	30	42	77
		T. 70	Av. 45.3%	Av.56%
Commercial				
12 Book'g.	610	27	60	66
13 "	841	56	86	88
11 Typ.	737	56	77	100
4 "	374	15	43	55
4A Office Prac.	154	10	38	44
		T. 144	Av. 61%	Av.52.6%
Drawing				
31 Mech.	1134	24	87	88
44 Com. Art	925	19	51	77
		T. 43	Av. 69%	82.5%
17 Sewing	737	30	46	66
54 Music	665	54	30	66
Library (as study)	750	40	55	77
Study Hall	2280	143	84	100

TABLE IV-A

FREQUENCY DISTRIBUTION SHOWING NUMBER OF SPECIAL ROOMS AT EACH INTERVAL FOR EACH OF THE TWO BASES OF COMPUTING PERCENTAGE OF USE

1	2	3
Interval	Seats Occupied: No. of Rooms	Room Occupied: No. of Rooms
0-10%	0	0
11-20	0	0
21-30	1	0
31-40	2	0
41-50	6	5
51-60	4	1
61-70	0	4
71-80	1	3
81-90	3	2
91-100	0	2

BERKELEY HIGH SCHOOL

Table I-B indicates the per cent of use of each of 27 classrooms of the Berkeley High School. Almost all of these rooms are located in the new building recently completed and should be up to standard in every way. However, the table indicates that, in 21 of the 27 rooms tabulated, there are too many seats for the floor area of the rooms. The range of seats in excess of the standard allowance is from three to 31. It would seem that such overcrowding would lessen the efficiency of these rooms. The surplus seats cause the percentage of use of the available area to exceed 100 in several cases. The averages at the bottom of the table indicate that the new rooms of the Berkeley High School are being used up to 90% of maximum possible use, 70% in terms of seats occupied, and 85% in terms of periods the room is occupied. These facts are emphasized in Table II-B which gives the frequency distribution for Table I-B. Practically all of the cases fall between 50 and 100 per cent. In the percentage of use of available area 7 rooms are shown to be over 100 per cent.

Table III-B shows the percentage of use of 20 special rooms, giving the area in square feet, capacity figured on actual student provisions, and the percentage of use figured on (a) student provisions;(b) length of time room is occupied during the day.

Of the various groups, it will be seen that the drawing rooms are used to the greatest extent. The averages for all the groups lie well above the 50 per cent mark. The distribution of cases is more clearly brought out by Table IV-B, which shows that the majority of cases in Column 2 are distributed above the 60 per cent mark, and in Column 3 above the 80 per cent mark.

TABLE I-B

TWENTY-SEVEN RECITATION ROOMS OF THE BERKELEY HIGH SCHOOL SHOWING: (1)CAPACITY OF EACH FIGURED ON AVAILABLE AREA; (2) CAPACITY FIGURED ON SEATS PROVIDED; (3) PERCENTAGE OF USE FIGURED ON (a) AREA, (b)SEATS (c)ROOM OCCUPIED.

	Capacity		(3) Percentage of use in terms of		
	(1)	(2)	(a)	(b)	(c)
Room No.	Fig. on Area	Seats prov.	Avail. area	Occ. seats	Room occ.
1	43	35	48	59	88
2	23	28	76	63	88
3	24	31	45	35	88
112	23	28	79	65	66
117	23	28	85	70	77
116	25	28	85	76	77
120	48	40	61	73	88
111	25	32	105	82	100
102	69	42	43	70	88
103	24	28	97	83	88
123	25	35	100	72	88
121	50	47	56	60	88
304	25	34	111	82	88
216	25	40	98	61	77
205-6	58	54	59	63	88
208	33	34	90	88	88
210	23	37	98	61	77
209	24	35	132	91	88
215	22	34	161	104	88
119	52	40	43	56	77
112	23	28	62	51	77
221	24	37	126	82	100
202	25	31	88	71	66
203	21	37	140	84	88
222	38	42	80	72	88
124	11	42	199	52	80
122	38	42	67	60	88
	T. 844	T.969	Av. 90%	Av.70%	Av.85%

TABLE II-B

FREQUENCY DISTRIBUTION SHOWING NUMBER OF RECITATION ROOMS AT EACH INTERVAL FOR EACH OF THE THREE BASES OF COMPUTING PERCENTAGE OF USE

1	2	3	4
Interval	Available Area: No. of rooms	Seats occ.: No. of rooms	Rooms occ.: No. of rooms
0-10	0	0	0
11-20	0	0	0
21-30	0	0	0
31-40	0	1	0
41-50	4	0	0
51-60	2	6	0
61-70	3	7	2
71-80	3	5	6
81-90	4	6	17
91-100	4	1	2
100	7	1	0

TABLE III-B

TWENTY SPECIAL ROOMS SHOWING: (1)AREA IN SQUARE FEET (2) CAPACITY FIGURED ON STUDENT ACCOMODATIONS ACTUALLY PROVIDED (3) PERCENTAGE OF USE FIGURED ON (a) STUDENT PROVISIONS (b)ROOMS OCCUPIED

	Capacity		(3) Percentage of Use in terms of	
	(1)	(2)	(a)	(b)
Room No.--Use	Area in sq.feet	Seats prov.	Student Provision	Room Occupied
Laboratories				
244-6 Chem.	2718	86	30	77
130 "	987	27	66	66
243-5 Phys.	11400	63	38	86
240 Bot.	918	32	91	100
242 Geog.	1716	30	52	77
230 Cook'g	1008	24	33	44
		T. 262	Av. 52%	Av. 75%
Shops				
165 Auto.	1320	15	104	88
261 Elec.	900	15	92	77
149 Ind-Supp	1000	25	49	66
161 Voc.Print.	1320	12	67	88
167 W.W.	1320	24	35	44
162 Mach.	1320	20	56	55
		T. 111	Av. 70.5%	Av. 70%
Drawing				
262 M.D.	1320	37	74	88
135 F.H.D.	864	18	72	66
137 F. H.D.	621	21	83	77
138 F.H.D.	621	25	78	77
		T. 101	Av. 77%	Av. 77%
Sewing				
231	655	28	88	88
232	775	56	39	88
		T. 84	Av. 63.5%	Av. 88%
Typing				
212	896	32	46	55
211	1080	45	62	100
		T. 77	Av. 54%	Av. 77.5%

TABLE IV-B

FREQUENCY DISTRIBUTION SHOWING NUMBER OF SPECIAL ROOMS AT EACH INTERVAL FOR EACH OF THE TWO BASES OF COMPUTING PERCENTAGE OF USE

1	2	3
	Seats Occupied	Room Occupied
Interval	No. of rooms	No. of rooms
0 - 10	0	0
11-20	0	0
21-30	1	0
31-40	5	0
41-50	2	2
51-60	2	2
61-70	2	3
71-80	3	5
81-90	3	6
91-100	2	2
100	1	0

FREMONT HIGH SCHOOL

Table I-F shows the percentage of use of 22 recitation rooms of the Fremont High School figured on the number of seats occupied and the number of periods the room is used per day. Owing to the difficulty of securing sufficient data on the floor area of these rooms, the percentage of use of available area has not been calculated. Of the 903 seats provided in these recitation rooms, the table indicates that 67 per cent are used for approximately 74 per cent of the school day.

Table II-F indicates the number of rooms according to the percentage of use of seats occupied and room occupied. As in the case of Alameda and Berkeley, the great majority of cases fall between 50 and 100 per cent.

Table III-F indicates the percentage of use of 24 special rooms grouped according to their respective uses. In percentage of use of student accomodations the drawing room group stands highest, while in percentage of use according to time the room is occupied, the laboratories score highest, closely followed by the commercial group. In the frequency distribution of Table IV-F, the majority of cases in column 2 fall above 50 per cent, while in column 3 the majority of cases fall above 70 per cent.

TABLE I-F

TWENTY-TWO RECITATION ROOMS OF THE FREMONT HIGH SCHOOL SHOWING: (1) CAPACITY OF EACH FIGURED ON AVAILABLE AREA (2) CAPACITY FIGURED ON SEATS PROVIDED (3) PERCENTAGE OF USE FIGURED ON (a) AREA (b) SEATS (c)ROOM OCCUPIED

		Capacity		(3) Percentage of Use in Terms of		
	(1)*	(2)	(a)	(b)	(c)	
Room No.	Flr.	Area	Seats prov.	Avail. area	Occ. seats	Room occup.
10			35		29.5	33
16			40		126	55
8			49		30	44
14			35		93	88
16			40		51	66
10			36		62.6	66
8			49		40	55
12			43		74	88
45			35		61.5	66
15			49		55	77
13			33		86	88
47			45		53	66
48			39		63	77
11			35		80	88
21			48		61.5	77
23			36		63	66
24			36		83	88
86			42		75	88
17			47		66	88
6			49		56	77
18			42		78	100
26			40		88	88
		T.	903		Av. 67%	Av. 74%

*No data available.

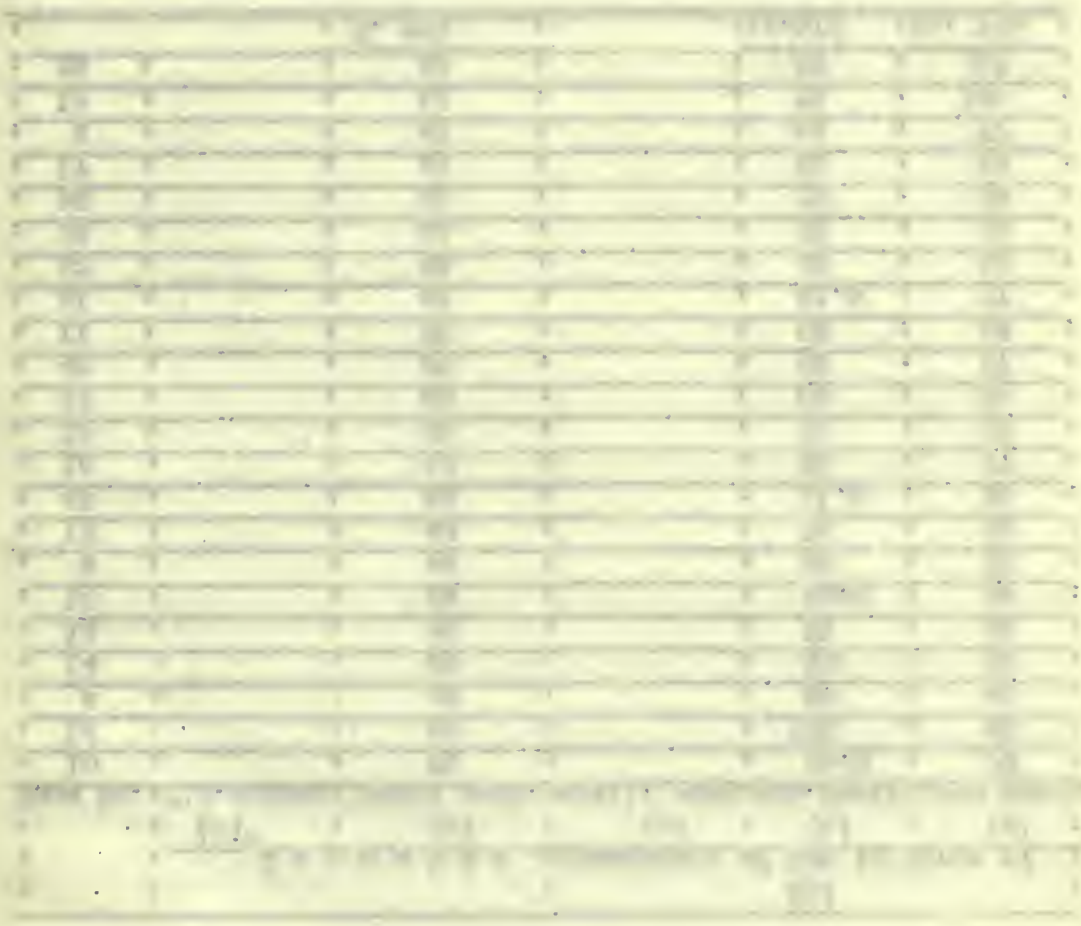


TABLE II-F

FREQUENCY DISTRIBUTION SHOWING NUMBER OF RECITATION ROOMS AT EACH INTERVAL FOR EACH OF THE THREE BASES OF COMPUTING PERCENTAGE OF USE

1	2	3	4
Interval	Available Area* No. of rooms	Seats Occup. No. of rooms	Room occup. No. of rooms
0-10%		0	0
11-20		0	0
21-30		2	0
31-40		1	1
41-50		0	1
51-60		4	2
61-70		6	5
71-80		4	4
81-90		3	8
91-100		1	1
100		1	0

TABLE III-F

TWENTY-FOUR SPECIAL ROOMS SHOWING: (1) AREA IN SQUARE FEET (2) CAPACITY FIGURED ON STUDENT ACCOMODATIONS (3)PERCENTAGE OF USE FIGURED ON (a) STUDENT PROVISIONS (b)ROOMS OCCUPIED

Room No.-Use	Capacity (1)* Area in sq.ft.	Capacity (2) Seats prov.	(3) Percentage of Use in Terms of: (a) Student provision	(3) Percentage of Use in Terms of: (b) Room occup.
Laboratories				
35 Chem.		44	79.5	100
29 Phys.		30	72.5	77
25 Biol.		43	56.5	81
37 Gen.Sci.		35	89	100
27 Gen.Sci.		49	39	77
31 Chem.		45	54.5	72
		T246	Av. 65%	Av. 84.5%
Drawing				
62		32	78	100
68		37	45	55
69		30	66	77
67		34	74	77
		T. 123	Av. 66%	Av. 77%
Commercial				
30 Book'g		51	47	66
66 Typ.		27	58	77
63 Typ.		45	76	100
65 Typ.		45	56.5	88
64 Sten.		40	53	77
28 Book'g		40	78	88
28 A		48	51	77
		T. 296	Av. 60%	Av. 82%
Househ'ldArts & Science				
41 Clothing		28	50	66
42 "		27	57	77
43 "		35	43	77
44 "		27	51	77
46 Foods		20	78	77
		T. 137	Av. 56%	Av. 75%
Music				
7		30	47	66
9		35	73	77
		T. 65	Av. 59%	Av. 71.5%

*No data available

TABLE IV-F

FREQUENCY DISTRIBUTION SHOWING NUMBER OF SPECIAL ROOMS AT EACH INTERVAL FOR EACH OF THE TWO BASES OF COMPUTING PERCENTAGE OF USE

1	2	3
	Seats Occupied:	Room Occupied
Interval	No. of seats	No. of seats
0-10	0	0
11-20	0	0
21-30	0	0
31-40	1	0
41-50	5	0
51-60	8	1
61-70	7	3
71-80	8	13
81-90	1	3
91-100	0	4

Oakland High School

Table I-O indicates the percentage of use of 23 recitation rooms of the Oakland High School. One of the striking facts brought out by Columns 1 and 2 of this table is the difference between the number of seats that should be in the room according to standard and the number of seats that actually are there. The totals of these columns indicate that the rooms should accomodate 1443 seats, but actually only contain 991, a loss of 452, or approximately 30 per cent. Either the rooms are too large for recitation rooms, or the classes are too small. A glance at the column containing the number of seats actually in the room would seem to indicate that the first inference is the correct one. The average use of available area is but 40 per cent, the average use of seats provided, 56.5 per cent, and the average use of the rooms in terms of time, 78.6 per cent. The fact that the rooms are used 78.6 per cent of the time and yet only 40 per cent of the available area is used, supports the conclusion that the rooms are too large for the classes using them. The frequency distribution shown by Table II-O further supports this conclusion, for the majority of cases of Column 2 fall under 50 per cent, while in Column 4 the majority of the cases fall over 70 per cent.

Continued from previous

Under the Constitution the Legislature is not to be restricted
powers of the Executive Right Honorable. One of the existing check-
back by Ministers I need a of more words to the Conference Chairman for
members to answer them because he is the most distinguished of Australians
and the Premier of South Australia and Premier. The Premier of
Great Britain Australia Labor the Prime Minister Australian Labor Premier
the Australian Only Minister Of, a Hour of Why, is Conservative
Of the Deal. Either the Queen for Jan Judge the Constitution Crown,
by his Attorney for the Well. I Opinion on the Future Australian
Her Queens of State Council. In the Prime Party be Executive
that the Crown Executive by the Political Law. The Governor the of
Commonwealth when It for of the Well, the Minister the of Queen Queen
Already Only the Well, and the Council and of the Crown In Queen of
Chief, Only the Queen. In that Just the Right the Crown Five the
Next In the Crown are the and of the Australian Queen to
Appeal, Australia the Australian that the Crown the Judge In the
Minister Right Crown. The Privy Constitution Queen of Judge Crown
Council Australia Only Australian, But the Majority of Queen to
Decision a Bill Crown Bill the Court, Which In Queen a the Judges
of the Court Bill Crown Of the Court.

Table III-O shows the percentage of use of 19 special rooms grouped under headings designating their use. It will be noted that the commercial group stands highest with an average of 70.8 per cent of use of student provisions, and an average of 88 per cent of use of time. The music group stands lowest in per cent of use of student provisions, but fairly high in per cent of time rooms are occupied. This would indicate that the classes are small, or that the rooms are larger than necessary for practical purposes.

Table IV-O, giving the frequency distribution for these special rooms, shows the majority of cases for Column 2 to be between 50 and 60 per cent, while the majority of cases for Column 3 range close to 80 per cent. It would seem that these special rooms are suffering from the same trouble as the recitation rooms, namely, oversize.

TABLE I-C

TWENTY-THREE RECITATION ROOMS OF THE
OAKLAND HIGH SCHOOL
SHOWING: (1) CAPACITY OF EACH FIGURED ON THE AVAILABLE AREA (2) CAPACITY FIGURED ON SEATS PROVIDED (3) PERCENTAGE OF USE FIGURED ON (a) AREA (b) SEATS (c) ROOM OCCUPIED

Room No.	Capacity (1) Fig. on Area	Capacity (2) Seats prov.	(3) Percentage of use in terms of: (a) Available A.	(b) Occ. seats	(c) Room occ.
1	64	46	43	60	66
2	50	42	52	73	88
3	64	40	46	73	88
4	64	46	47	66	77
6	64	48	32	44	77
8	80	48	37	62	88
9	64	48	40	64	88
10	64	43	43	65	88
11	57	40	49	69	88
12	52	42	39	48	77
13	64	45	30	42	77
15	64	44	37	54	77
16	64	49	39	51	77
17	66	48	38	52	77
18	66	48	47	65	88
19	78	47	26	43	77
21	63	48	38	49	77
22	63	42	37	55	88
29	83	50	22	60	77
33	49	38	28	37	55
46	65	40	32	51	66
49	44	33	58	77	77
51	42	36	53	50	77
	T. 1443	T. 991	Av. 40%	Av. 56.5%	Av. 78%

TABLE II-O

FREQUENCY DISTRIBUTION SHOWING NUMBER OF CLASSROOMS AT EACH INTERVAL FOR EACH OF THE THREE BASES OF COMPUTING PERCENTAGE OF USE

1	2	3	4
Interval	Available Area: No. of rooms	Seats Occ.: No. rooms	Room Occ. No. of rooms
0-10%	0	0	0
11-20	0	0	0
21-30	4	1	0
31-40	10	1	0
41-50	6	6	0
51-60	3	7	1
61-70	0	5	2
71-80	0	3	12
81-90	0	0	8
91-100	0	0	0

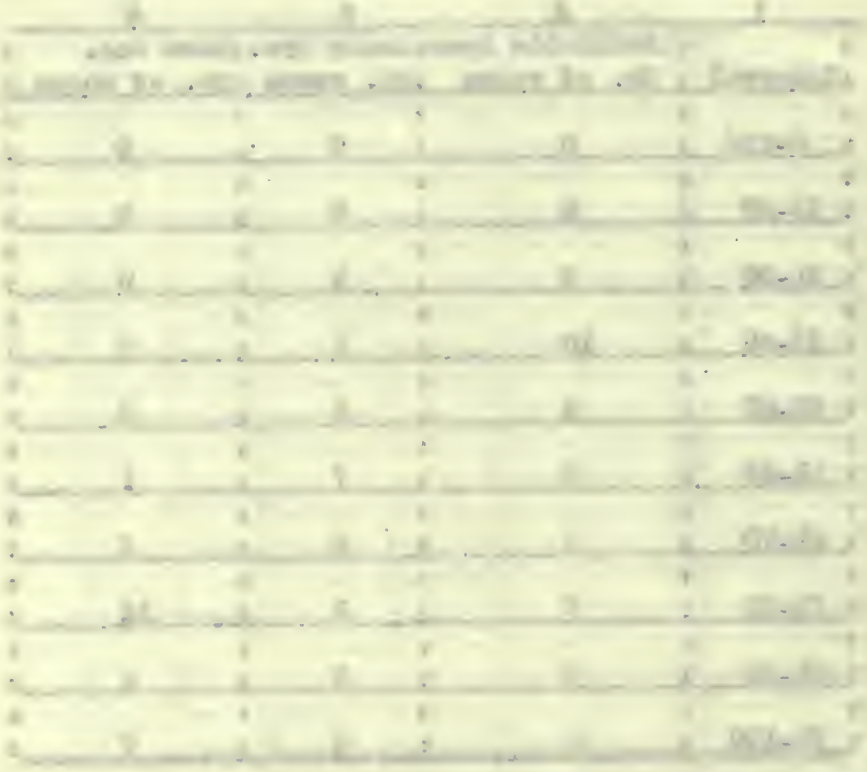


TABLE III-O

NINETEEN SPACIAL ROOMS SHOWING:
(1) AREA IN SQUARE FEET (2) CAPACITY FIGURED ON STUDENT ACCOMODATIONS ACTUALLY PROVIDED (3) PERCENTAGE OF USE FIGURED ON (a) STUDENT PROVISIONS (b) ROOMS OCCUPIED

Room No.--Use	Capacity (1) Area in Sq.ft.	Capacity (2) Seats prov.	(3) Percentage of Use in Terms of (a) Student Provision	(3) Percentage of Use in Terms of (b) Room occupied
Laboratories:				
28 Gen.Sci.	1151	43	62	100
30 Biology	1316	40	66	100
31 Chem.	1920	70	40	100
41 Dom.Sci.	972	24	87	77
43 " "	1008	33	77	100
45 " "	972	27	15	22
		T. 237	Av. 58%	Av. 83%
Commercial				
47 Typ.	1200	32	95	100
5-5A Typ.	972	41	64	88
7 Typ.	1065	28	70	66
42 Book'g	1008	45	66	100
14 "	972	42	59	88
		T. 188	Av. 70.8%	Av. 88%
Drawing				
20 F.H.D.	1175	47	58	77
34 F.H.D.	1000	38	53	66
32 M.D.	998	34	60	77
		T. 119	Av. 57%	Av. 73.3%
Music				
40 Band	672	36	20	66
44 Music	972	46	37	77
48 Music	1212	68	22	77
		T. 150	Av. 26.3%	Av. 73.3%
Study				
23	2176	200	26	77
27	1250	96	49	88
		T. 296	Av. 37.5%	Av. 82.5%

TABLE IV-O

FREQUENCY DISTRIBUTION
SHOWING NUMBER OF SPECIAL ROOMS
AT EACH INTERVAL FOR EACH OF THE TWO BASES OF
COMPUTING PERCENTAGE OF USE

1	2	3
Interval	Seats occ.	Room occ.
	No. of rooms	No. of rooms
0-10%	0	0
11-20	2	0
21-30	2	1
31-40	2	0
41-50	1	0
51-60	4	0
61-70	5	3
71-80	1	6
81-90	1	5
91-100	1	6

Piedmont High School

Table I-P shows the percentage of use of 13 classrooms of the Piedmont High School. The percentage of use of available area, 51.5 per cent, is nearly the same as that of the use of seats provided, 53.7 per cent. The fact that neither of these range much above 50 per cent is partly explained by the fact that the Piedmont High School, while waiting the completion of the new building, is housed in various nondescript makeshifts reminiscent of the former Casino. Three of the rooms listed, namely A, B, C, are rooms in the new building that are already in used, although unfinished.

Table II-P, giving the frequency distribution for the classrooms, indicates that approximately one-half of the cases occur at 50 per cent in Column 2 and Column 3, while the majority of cases in Column 4 fall above 70 per cent.

Table III-P gives the percentage of use for the four special rooms listed. In regard to student provision, the science laboratory is working up to 111 per cent of its capacity and is occupied 87.5 per cent of the day.

Conclusion [illegible]

[illegible] [illegible] [illegible] [

TABLE I-P

THIRTEEN CLASSROOMS OF THE PIEDMONT HIGH SCHOOL
SHOWING: (1) CAPACITY OF EACH FIGURED ON AVAILABLE AREA
(2) CAPACITY FIGURED ON SEATS PROVIDED (3) PERCENTAGE OF USE
FIGURED ON (a) AREA (b) SEATS (c) ROOM OCCUPIED

	Capacity		(3) Percentage of Use in Terms of:		
	(1)	(2)	(a)	(b)	(c)
Room No.	Fig. on Area	Seats prov.	Available Area	Occ. Seats	Room occupied
1	40	55	69	79	87.5
3	50	44	49	56	87.5
4	32	40	68	54	87.5
5	28	36	63	49	87.5
6	43	46	54	51	75
8	44	38	30	43	87.5
9	23	30	52	40	62.5
10	23	28	50	41	62.5
11	45	30	43	65	87.5
12	10	13	18	13	33
A	29	30	76	72	82.5
B	56	47	41	49	75
C	56	45	48	60	87.5
	T.479	T. 462	Av. 51.5%	Av. 51.7%	Av. 77.2%

TABLE II-P

FREQUENCY DISTRIBUTION SHOWING NUMBER OF CLASSROOMS AT EACH INTERVAL FOR EACH OF THE THREE BASES OF COMPUTING THE PERCENTAGE OF USE

Interval	Available Area: No. of rooms	Seats occ.: No. rooms	Room occ.: No. rooms
0-10%	0	0	0
11-20	1	1	0
21-30	0	0	0
31-40	1	1	1
41-50	5	4	0
51-60	2	4	0
61-70	3	1	2
71-80	1	2	2
81-90	0	0	8
91-100	0	0	0

TABLE III-P

FOUR SPECIAL ROOMS SHOWING:
(1) AREA IN SQUARE FEET (2) CAPACITY FIGURED ON STUDENT ACCOMODATIONS ACTUALLY PROVIDED (3) PERCENTAGE OF USE FIGURED ON (a) STUDENT PROVISIONS (b) ROOMS OCCUPIED

	Capacity		(3) Terms of: Percentage of Use in	
Room No.--Use:	(1)	(2)	(a)	(b)
	Area in sq.ft.	Seats prov.	Student prov.	Room occ.
Typ.	420	15	39	50
Music	480	35	75	87.5
Science lab:	672	24	111	87.5
Drawing	780	50	50	75

Table IV for the Piedmont High School is omitted, since four cases hardly necessitate a frequency distribution.

Oakland Technical High School

Table I-T shows the percentage of use of 29 recitation rooms of the Oakland Technical High School. Owing to the fact that the data on floor areas could not be obtained, it was necessary to omit the capacity as figured on ~~car~~ and the percentage of use of available area. Of the 1025 seats provided by these 29 recitation rooms, an average of 71% are used during the day, while the rooms are being occupied an average of 81 % of the school day of ten periods.

The frequency distribution of these recitation rooms is shown by Table II-T. In both columns the majority of cases fall above 70 per cent, while no cases are to be found below 50 per cent in either column. There are eight rooms which are being used every period of the day, and four rooms which have between 91 and 100 per cent of their seats occupied for the day. One of the reasons for the high percentages found is that the Oakland Technical High School has larger cla sses than the average, a number of them running over 40. The majority of classes contain between 30 and 40 students.

Table III-T shows the percentage of use of 35 special rooms based upon the student provisions and the time the room is occupied. As explained for Table I-T, the data on floor areas were unobtainable. Of the various groups listed on this table, the shops are working

nearest their limit, using the rooms 80 per cent of the time and using 85 per cent of the student provisions. As most of these shops are working under the Smith-Hughes, they are limited to 20 students each.

The laboratories appear to be working the least. This is due to the fact that several of the laboratories have an adjoining lecture room which is unoccupied when the class is in the laboratory. This space could be saved by a combination of lecture room and laboratory.

The reason for the study (9 and 13) being used 110 per cent of the time is that it is used one period after school, or one more period than the 10-period day used as a basis for computation.

Table Iv-T, showing the frequency distribution of these special rooms, indicates that the majority of cases in Column 2 fall above 61 per cent, and the majority of cases in Column 3 fall above 71 per cent.

TABLE I-T

TWENTY-NINE RECITATION ROOMS OF THE OAKLAND TECHNICAL HIGH SCHOOL SHOWING: (1) CAPACITY OF EACH FIGURED ON AVAILABLE AREA (2) CAPACITY FIGURED ON SEATS PROVIDED (3) PERCENTAGE OF USE FIGURED ON (a) AREA (b) SEATS (c) ROOM OCCUPIED

	Capacity		(3) Percentage of Use in Terms of		
	(1) *	(2)	(a) Available	(b) Occ.	(c)
Room No.	Fig. on Area	Seats prov.	Area*	Seats	Room occup.
3		34		84	90
7		33		89	100
11		35		86	100
15		36		84	100
17		42		75	100
19		30		74	100
20		35		82	70
22		26		96	90
24		36		67	70
26		31		60	80
28		33		67	70
31		35		72	80
35		35		93	100
37		40		91	100
39		20		54	50
44		40		57	70
203		32		43	70
201		45		64	80
207		37		53	70
209		42		78	90
211		35		82	90
213		42		54	60
215		37		75	80
217		40		92	100
219		32		82	90
227		37		87	90
236		37		40	70
239		25		34	40
250		40		46	70
	T. 1025		Av. 71%		Av. 81%

*No data available

TABLE II-F

FREQUENCY DISTRIBUTION SHOWING NUMBER OF RECREATION ROOMS AT EACH INTERVAL FOR TWO OF THE THREE BASES OF COMPUTING PERCENTAGE OF USE

1	2	3	4
	Available Area:	Seats Occ.:	Rooms occupied
Interval	No. of rooms	No. rooms	No. of rooms
0-10		0	0
11-20		0	0
21-30		0	0
31-40		2	1
41-50		2	1
51-60		6	1
61-70		3	0
71-80		5	4
81-90		0	5
91-100		4	0

*No data available

TABLE III-T

THIRTY-FIVE SPECIAL ROOMS SHOWING: (1) AREA IN SQUARE FEET (2) CAPACITY FIGURED ON STUDENT ACCOMODATIONS ACTUALLY PROVIDED (3) PERCENTAGE OF USE FIGURED ON (a) STUDENT PROVISIONS (b) ROOM OCCUPIED

Room No.--Use	Capacity (1) Area in sq.ft.*	Capacity (2) Seats provided	(3) Percentage of Use in Terms of (a) Student Provision	(3) Percentage of Use in Terms of (b) Room Occup.
Laboratories				
2		48	56	90
10		30	29	40
12		30	19	30
18 Cooking		24	16	20
210 & 206 (Lab.& Lect.)		72	63	90
212 & 202 (Lab.& Lect.)		78	56	90
214 & 204 (Lab.& Lect)		78	47	90
		T. 360	Av. 38%	Av. 64%
Drawing				
40		26	22	30
42		27	60	80
48		28	61	80
50		25	63	70
240		28	74	80
242		26	60	90
244		26	76	60
240		28	65	80
		T. 220	Av. 60%	Av. 74%
Shops				
52 Gen.Mach.		30	76	90
68 Pattern		20	80	80
54 Forge		20	80	80
58 Electric		20	98.5	90
56 Auto		20	95	90
70 Cabinet		16	83	50
68 Carp & Mill		18	80	80
		T. 146	Av. 85%	Av. 80%

(Continued on the next page)

TABLE III-T (Cont.)

Room No. – Use	(1)* Area in sq. ft.	(2) Seats provided	(3) Percentage of Use in Terms of: (a) Student provisions	(b) Room occ.
Commercial				
25 Typ.		30	65	90
33 Typ.		30	56	60
225 Typ.		30	86	90
333 Typ.		30	53	60
235 Mach. Cak.		21	57	60
231 Book'g.		35	73	80
		T. 176	Av. 68.3%	Av. 73.8%
Sewing				
220		28	82	90
222		32	54	70
228		28	70	80
230		32	75	90
		T. 120	Av. 70%	Av. 82.5%
Lecture Rooms				
4		40	53	90
60		55	33	60
		T. 95	Av. 43%	Av. 75%
Study				
9 & 13 Double Room		86	97	110

*No data available

TABLE IV-T

FREQUENCY DISTRIBUTION SHOWING NUMBER OF SPECIAL ROOMS AT EACH INTERVAL FOR EACH OF THE TWO BASES OF COMPUTING PERCENTAGE OF USE

Interval	Seats Occupied: No. of seats	Rooms Occupied: No. of seats
0-10%	0	0
11-20	2	1
21-30	2	2
31-40	2	1
41-50	1	1
51-60	8	4
61-70	5	2
71-80	8	10
81-90	4	13
91-100	3	0
100	0	1

University High School

Table I-U shows the percentage of use of 21 recitation rooms of the University High School. It will be noted that, while the total capacity figured on area is 761, only 567 seats are provided. The University High School consists in an obsolete wooden building surrounded by a conglomeration of portables, shacks, and barns, and under the circumstances the authorities are probably justified in disregarding floor area standards. This, coupled with the fact that the classes are kept as small as possible, accounts for the low figures in percentage columns "a" and "b." Column "c" indicates that the rooms are being used 84.9 per cent of the school day.

Table II-U, giving the frequency distribution of these recitation rooms, places the majority in Column 2 above 51 per cent, in Column 3 above 61 per cent, and in Column 4 above 81 per cent.

Table III-U shows the percentage of use of 12 special rooms. The general average of these rooms is high, the highest group being that of the drawing rooms, which reach 92 per cent in terms of the rooms being occupied. In terms of use of student provisions the laboratories reach highest with an average use of 74 per cent.

In the case of the study room (19), the congestion indicated by the 131 per cent has been partly solved by sending the overflow to

the library, which is used as a study room, in addition to its regular use, for an average of 88 per cent in terms of room occupied.

Table IV-U, giving the frequency distribution for these special rooms, indicates that the majority of cases in Column 2 fall above 71 per cent, and in Column 3 above 11 per cent.

TABLE IV-U

FREQUENCY DISTRIBUTION SHOWING NUMBER OF SPECIAL ROOMS AT EACH INTERVAL FOR EACH OF THE TWO BASES OF COMPUTING PERCENTAGE OF USE

Interval	Seats Occupied: No. of rooms	Room Occupied: No. of rooms
0-10%	0	0
11-20	0	0
21-30	0	0
31-40	0	0
41-50	2	1
51-60	1	0
61-70	2	0
71-80	5	1
81-90	1	8
91-100	0	2
100	1	0

TABLE I-U

TWENTY-ONE RECITATION ROOMS OF THE UNIVERSITY HIGH SCHOOL SHOWING: (1) CAPACITY OF EACH FIGURED ON AVAILABLE AREA (2) CAPACITY FIGURED ON SEATS PROVIDED (3) PERCENTAGE OF USE FIGURED ON (a) AREA (b) SEATS (c) ROOM OCCUPIED

Room No.	Capacity (1) Fig. on Area	Capacity (2) Seats prov.	(3) Percentage of Use in Terms of (a) Available Area	(b) Occ. seats	(c) Room occupied
2	23	21	78	85	88
3	24	25	75	72	88
4	27	20	58	56	88
6	65	25	26	68	77
7	49	29	41	69	88
8	52	36	36	72	88
9	49	31	40	64	88
10	45	33	40	64	88
11	24	24	57	57	77
14	27	21	58	76	77
16	54	50	57	65	100
17	50	47	64	57	88
18	51	40	47	61	88
21	41	24	29	50	77
21A	28	22	66	84	88
27	46	35	53	70	88
28A	25	20	71	89	88
28B	25	20	56	70	88
32	25	24	70	73	88
33	26	19	67	66	77
34	26	23	54	61	66
	T. 761	T. 567	Av. 54%	Av. 68.6%	Av. 84.9%

TABLE II-U

FREQUENCY DISTRIBUTION SHOWING NUMBER OF RECITATION ROOMS AT EACH INTERVAL FOR EACH OF THE THREE BASES OF COMPUTING PERCENTAGE OF USE

1	2	3	4
Interval	Avail. Area: No. rooms	Seats Occ.: No. rooms	Room Occ. No. of rooms
0-10%	0	0	0
11-20	0	0	0
21-30	2	0	0
31-40	3	0	0
41-50	2	1	0
51-60	8	4	0
61-70	3	8	1
71-80	3	4	5
81-90	0	4	14
91-100	0	0	1

TWELVE SPECIAL ROOMS SHOWING:
(1) AREA IN SQUARE FEET (2) CAPACITY FIGURED ON STUDENT ACCOMODATIONS ACTUALLY PROVIDED (3) PERCENTAGE OF USE FIGURED ON (a) STUDENT PROVISION (b) ROOMS OCCUPIED

	Capacity		(3) Percentage of Use in terms of	
	(1)	(2)	(a)	(b)
Room No.--Use:	Area in sq.ft.	Seats prov.	Student Prov.	Room occ.
Laboratories				
20	651	24	82	100
22	662	23	67	88
26	655	23	72	77
36	904	21	75	88
		T. 91	Av. 74%	Av. 88.2%
Drawing				
23	645	27	60	88
24	652	14	77	88
25	655	24	77	100
		T. 65	Av. 71.3%	Av. 92%
35 Man.Tr.	1480	21	49	44
19 Study	702	68	131	88
15 Library	750	50	77	88
30 Music	1074	45	49	88
37 Millin-ery	1101	24	66	88

Summary

Table V is a compilation of the averages found in the Table I series for each of the 7 Bay Cities High Schools. The capacity of the recitation rooms of each school in terms of actual seats provided as well as in terms of maximum possible number of seats according to standards. The percentage column indicates for each school the average use made of the recitation rooms according to (a) the available area, (b) the seats occupied, and (c) time the rooms are occupied.

In terms of the percentage of use of available area the various schools, with the exception of the Berkeley High School, average a little more than 50 per cent. Oakland averages only 40 per cent for reasons explained in the discussion of Table I-O. The exceptionally high standing of the Berkeley High School is due to the fact that the recitation rooms contain more than the standard number of seats, as shown by the table. In the percentage of actual use made of these seats the school averages 70 per cent. It must be borne in mind that the Berkeley High School is in an unsettled state, owing to the fact that the new building group has not been entirely completed. Some of the classes occupy the new unit, while others are still located in the old buildings. This unsettled condition must be taken into consideration in estimating the

actual use made of the entire plant.

Oversize Rooms

A study of percentage columns "a" and "c" reveals the fact that on the average, while the rooms are occupied 80 per cent of the time, they are only using about 50 per cent of their actual seating capacity. Either the classes are too small, or the rooms are too large for the average size class. A study of the original tabulation sheets reveals the fact that the majority of the classes occupying these rooms number between 30 and 40. Obviously, therefore, many of these recitation rooms are too large for the average class and could never be used up to 100 per cent in terms of every seat being occupied. As an illustration of this, Room 23 of the Alameda High School has an area of 870 square feet, which, in terms of the Strayer-Englehardt standards, should contain 58 seats. The average number of pupils in each class using this room during the day is 29. In this case 58-29, or 29 represents the number of unused seats for the average class. More careful planning of school rooms would result in the utilization of much of this wasted area.

Table VI shows the percentage of use made of the laboratory groups of the East Bay High Schools. The range of use of student

accomodations is from 38 per cent for the Oakland Technical High School to 74 per cent for the University High Schools. It is true that Piedmont High School uses 111 per cent of its student accomodations, but this is because of the fact that the Piedmont High School has but one laboratory and is forced to use it for all purposes of laboratory instruction. The low percentage made by Technical High School is due to the fact that several of the laboratories have lecture rooms attached, which remain unoccupied when the laboratories are in use. This waste space could be utilized by converting the laboratories into combined laboratory-lecture rooms and utilizing the lecture rooms as class-rooms.

Table VII shows the percentage of use of the shop groups of the East Bay Cities High Schools. It will be noted that three of the schools, Fremont High, Oakland High, and Piedmont High, have no shops. Of the remaining four schools, Technical High School ranks highest, both in percentage of use of student provisions and in percentage of use of the rooms. The majority of the Technical High School shops are operated on the Smith-Hughes plan.

Table VIII shows the percentage of use made of the drawing room groups of the Seven East Bay High Schools. It will be noted that in percentage of use of student accomodations, all of the schools fall above 50 per cent, the highest rank being held by Berkeley

High School, with an average percentage of use of 77 per cent. In terms of the percentage of use of the rooms all the schools fall above 73 per cent, the highest percentage being 92, that of the University High School.

Table IX shows the percentage of use made of the commercial groups of the various high schools named. This group includes typing rooms, bookkeeping rooms, and machine calculation rooms. In percentage of use of student provisions, the schools range from 54 to 70.8 per cent. Piedmont High School is not considered, as its data is based on one room only, which is used for typing. In the percentage of use of periods the rooms are occupied, the schools range from 52.6 to 77.5 per cent. It will be noted that the Berkeley High School is at either extreme of these ranges, having a percentage of 54 in terms of use of student provisions and a percentage of 77.5 in terms of use of room. Evidently the rooms are used frequently, but the classes are small. This conclusion is borne out by an examination of the original tabulation sheets, which show the classes to be comparatively small in enrollment.

TABLE V

GROUP OF RECITATION ROOMS OF SEVEN BAY CITY HIGH SCHOOLS SHOWING: (1) CAPACITY OF EACH FIGURED ON AVAILABLE AREA (2) CAPACITY FIGURED ON SEATS PROVIDED (3) PERCENTAGE OF USE FIGURED ON (a) AREA (b) SEATS (c) ROOM OCCUPIED

School	Capacity (1) Fig. on Area	Capacity (2) Seats prov.	(3) Percentage of Use in Terms of (a) Avail. Area	(b) Occ. seats	(c) Room occ.
Alameda High	724	623	52	61	75.8
Berkeley "	844	969	90	70	85
Fremont "		903		67	74
Oakland "	1443	991	40	56.5	78.6
Piedmont "	479	462	51.5	51.7	77.2
Technical"		1025		71	81
Universit,"	761	567	54	68.6	84.9

TABLE VI

THE LABORATORY GROUPS
OF THE SEVEN BY CITIES HIGH SCHOOLS SHOWING:
(1) CAPACITY BASED ON SEATS PROVIDED (2) PERCENTAGE OF USE
BASED ON (a) STUDENT PROVISIONS (b) ROOMS OCCUPIED

School	(1) Capacity	(2) PERCENTAGE in terms of	
		(a)	(b)
	Seats Prov.	Student Prov.	Room occ.
Alameda High	114	46	53
Berkeley "	262	52	75
Fremont "	246	65	84.5
Oakland "	237	58	83
Piedmont "	24	111	87.5
Technical "	360	38	64
University "	91	74	80.2

TABLE VII

THE SHOP GROUPS OF THE SEVEN BAY CITIES HIGH SCHOOLS SHOWING: (1) CAPACITY BASED ON STUDENT ACCOMODATIONS PROVIDED (2) PERCENTAGE OF USE BASED ON (a) STUDENT PROVISIONS (b) ROOMS OCCUPIED

School	(1) Capacity: Seats prov.	(2) Percentage in Terms of (a) Stud. Prov.	(b) Rooms occ.
Alameda High	70	45.3	56
Berkeley "	111	70.5	70
Fremont * "	—	—	—
Oakland* "	—	—	—
Piedmont* "	—	—	—
Technical	146	85	80
University "	21	49	44

*No shops

TABLE VIII

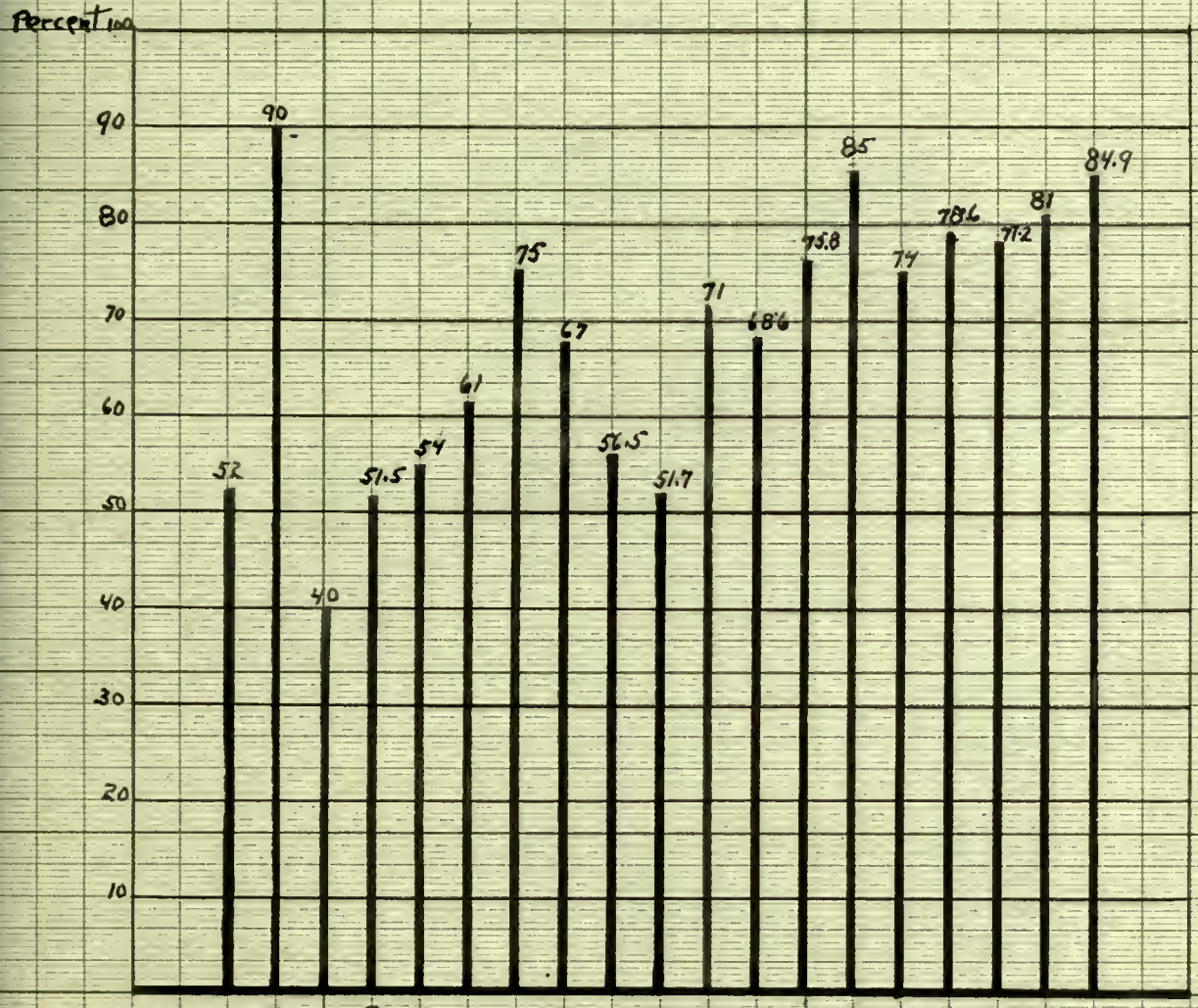
THE DRAWING GROUPS OF THE SEVEN BAY CITIES HIGH SCHOOLS SHOWING: (1) CAPACITY BASED ON SEATS PROVIDED
(2) PERCENTAGE OF USE BASED ON (a) STUDENT PROVISIONS
(b) ROOMS OCCUPIED

School	(1) Capacity	(2) Percentage in Terms of	
	Seats prov.	(a) Stud. prov.	(b) Room occ.
Alameda High	43	69	82.5
Berkeley "	101	77	77
Fremont "	123	66	77
Oakland "	119	57	73.3
Piedmont "	50	50	75
Technical "	220	60	74
University "	65	71.3	93

TABLE IX

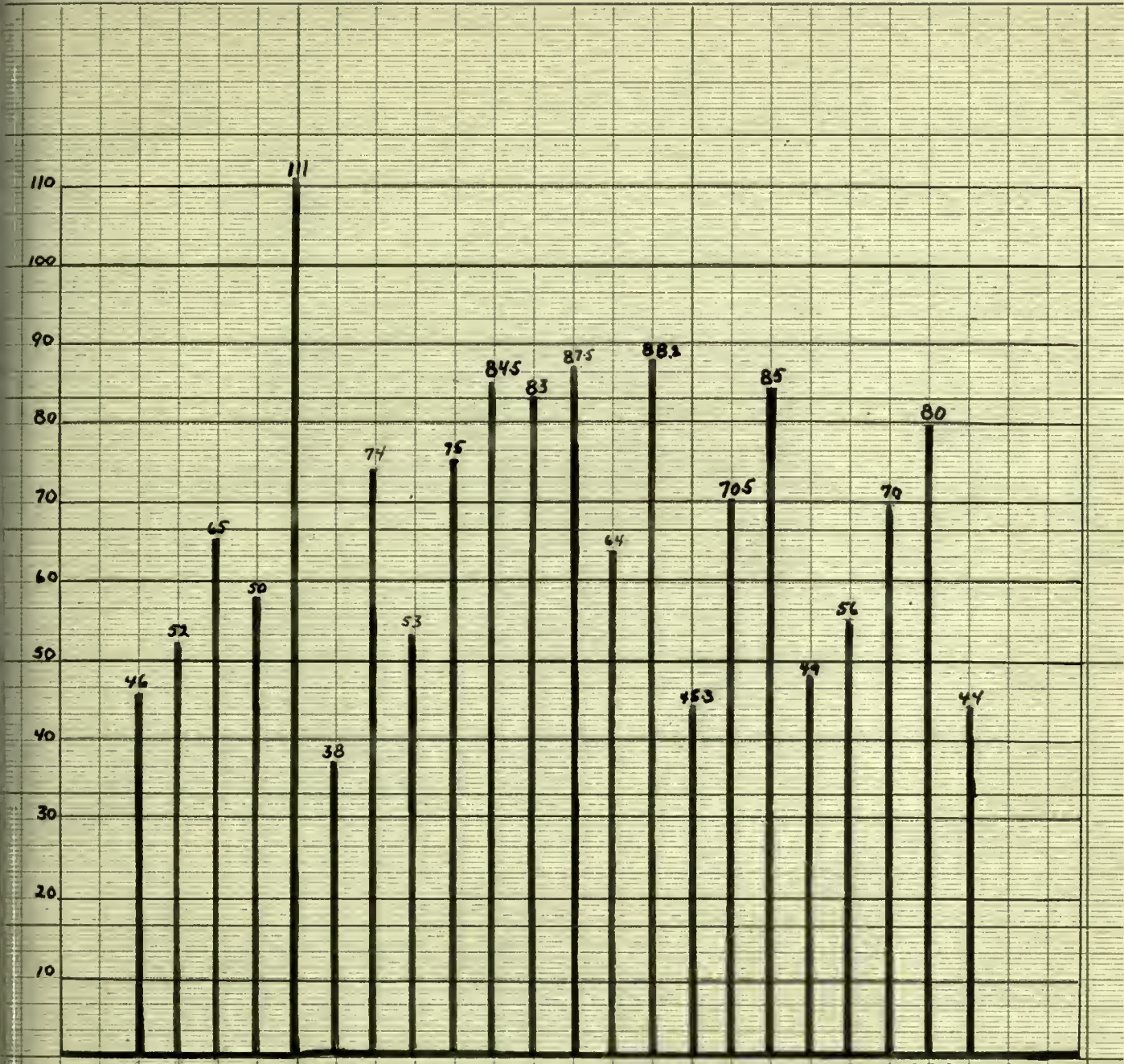
THE COMMERCIAL GROUPS OF THE SEVEN BAY CITIES HIGH SCHOOLS
SHOWING: (1) CAPACITY BASED ON SEATS PROVIDED
(2) PERCENTAGE OF USE BASED ON (a) STUDENT PROVISIONS
(b) ROOMS OCCUPIED

School	(1) Capacity (Seats prov.	(2) Percentage in terms of (a) Stud. prov.	(b) Room occ.
Alameda High	144	61	52.6
Berkeley "	77	54	77.5
Fremont "	296	60	82
Oakland "	188	70.8	88
Piedmont "	15	39	50
Technical "	176	68.3	73.3
University "	—	—	—



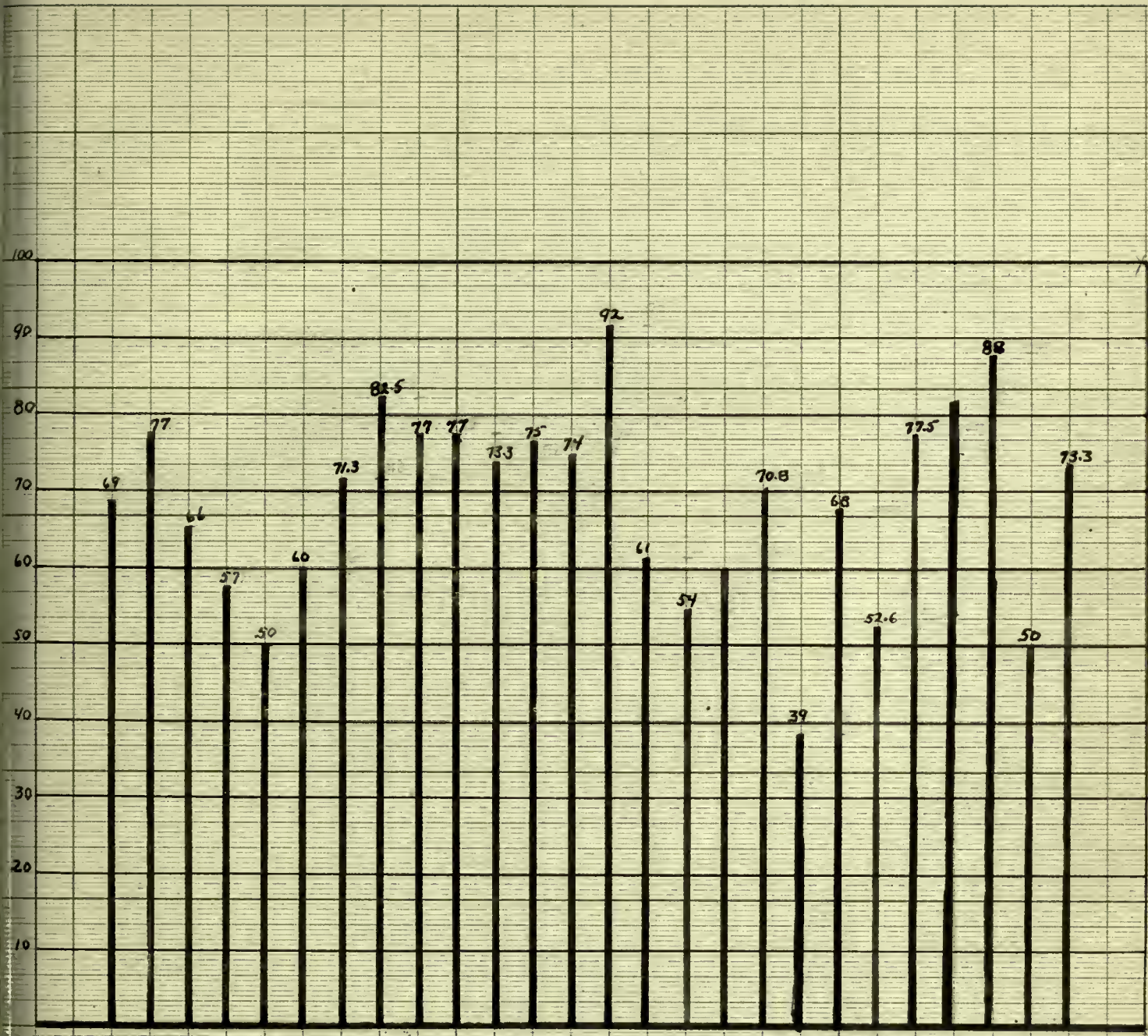
Percentage of Use of Recitation Rooms.

CHART I



Percentage of Use of Laboratories and Shops

CHART II



Percentage of Use of Drawing Rooms and Commercial Rooms

CHART III

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