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NATIONAL RESEARCH COUNCIL
CANADA
DIVISION OF BUILDING RESEARCH

TEMPERATURE AND HUMIDITY IN HOUSES,
HALIFAX 1960-61

by
D. R. Robson

Internal Report No. 261
of the
Division of Building Research

Ottawa
MARCH 1963

PREFACE

It is of value in a number of ways in the work of the Division to know what temperature and humidity conditions are maintained within buildings and how these relate to climate and other factors. Such records must be obtained for a substantial number of cases in order to be significant, but when this is done, for buildings located in different parts of the country, some interesting and important conclusions can be drawn. Dwellings and schools are of particular interest and information on them is being obtained, using simple recording instruments, in several regions of the country.

The results now reported were obtained for 1960-61 from houses in Halifax. The author is a mechanical engineer and a research officer with the Atlantic Regional Station of the Division, located in Halifax.

Ottawa
March 1963

N. B. Hutcheon
Assistant Director

TEMPERATURE AND HUMIDITY IN HOUSES,

HALIFAX 1960-61

by

D. R. Robson

In December 1960, a survey was initiated in the Halifax area to provide a record of actual temperature and humidity conditions in occupied houses to complement similar information collected for houses in Ottawa, Camp Gagetown, Saskatoon and Vancouver.

The eleven houses chosen were in the Halifax metropolitan area to minimize travel and eliminate as many variables as possible due to outdoor climate. The choice was limited to relatively new dwellings where the homeowners showed some interest in the project. Four of the houses were in Dartmouth, two in Halifax, and four in the Armdale-Jollimore area of Halifax County. The eleventh was in the Bedford area and was used as one of the study houses because of previous instrumentation for a condensation problem. All houses were instrumented in December 1960, but for various reasons the temperature and humidity records of seven of the houses had to be discontinued in May; the records of the remaining four houses were carried on for the balance of the year.

The information required for this survey consisted of continuous records of temperature and relative humidity for each house. This was accomplished by means of a clock-driven 7-day drum chart on which were recorded the changes in relative humidity registered by a hair element and changes in temperature registered by a bimetal element. The instruments used were hygrothermographs (Figure 1) and were calibrated on a regular basis using an electrically aspirated psychrometer because the hair element cannot be relied upon for accuracy over a wide range of humidity. The hygrothermographs were generally located in the living room of each house, 30 to 36 in. above the floor.

The outdoor weather record was obtained from information published by the Department of Transport for the weather station at the Federal Building in downtown Halifax. Although the weather station is some distance from the houses under study, the records obtained are considered to be sufficiently accurate for comparison purposes as the station is centrally located relative to the houses under study.

INDOOR CLIMATE STUDY

Presentation of Information

The description of each house as recorded includes information on the heating system and house construction (Figures 2 to 12).

A photograph and a floor plan of each house (Figures 13 to 23) are included to give the reader a comprehensive idea of the types of houses involved in the study.

Weather information from the Department of Transport is presented in graph form (Figure 24). The period covered is from 6 December 1960 to 26 December 1961. The humidity ratio, relative humidity, and outside air temperature are plotted from weekly averages for the 52 weeks involved. The degree days (65°F base) are plotted for each week for the same period.

The indoor conditions are plotted for each house from the hygrothermograph records (Figures 25 to 35). The values used are weekly averages for the inside air temperature, relative humidity and humidity ratio. The dotted lines on the graphs represent the average conditions for all houses.

The outside and inside weekly average temperatures and humidity ratios are plotted for the same period (Figure 36). The dotted line in each case represents the outdoor conditions; the solid line represents the average indoor conditions for all houses.

The highest individual monthly average temperature, the lowest individual monthly average temperature, and the monthly average temperature of the indoor conditions for all houses are plotted on the same graph as the monthly average outdoor temperature conditions (Figure 37).

The highest individual monthly average humidity ratio, the lowest individual monthly average humidity ratio, and the monthly average humidity ratio of the indoor conditions for all houses are plotted on the same sheet as the monthly average outdoor humidity ratio conditions (Figure 38).

The monthly average indoor humidity ratio has been plotted against the monthly average outdoor humidity ratio for each of the four houses that has a complete 12-month record. The straight line in each case represents a median line where the indoor and outdoor humidity ratios are equal (Figure 39).

The monthly average temperature and relative humidity for each house have been tabulated (Table I); the last two columns in the Table record the monthly average outdoor temperature and humidity.

DISCUSSION OF INFORMATION COLLECTED

Houses (Figures 2 to 11)

One house (No. 4) has a hot-water heating system and one (No. 6) has a combination warm-air with radiant floor system; one (No. 5) is built on a crawl space with the heating system piped to the registers; four (Nos. 2, 3, 7, 9) are built on crawl spaces with the crawl space used as a plenum, and four (Nos. 1, 8, 10, 11) have conventional forced warm-air systems. Only three houses (Nos. 1, 8, 11) have humidifiers.

Weather (Figure 24)

From the weather data collected for the outdoor conditions (Figure 24), it is interesting to note that the weekly average outdoor relative humidity varies between 70 and 85 per cent with few peaks above or below these values. The humidity ratio varied from a weekly average low of 5 grains per pound of dry air in early February to a weekly average high of 85 grains per pound of dry air in July and August.

Temperature

The weekly average indoor temperature remained fairly uniform throughout the heating season, between 66 and 69°F (Figure 36). In July and August the weekly average indoor temperature rose above 70°F when the weekly average outdoor temperature approached or exceeded 66°F. Figure 37 gives a better picture of the conditions as recorded in that the maximum and minimum indoor monthly averages are included. The maximum weekly average seldom exceeds 70°F during the heating season and is in fact below 70°F for most of this period (Figure 36). The weekly average indoor temperature being in the 66 to 68°F range for most of the heating season suggests that night set-back has a decided effect on the weekly average temperature. Nine of the houses used a daytime thermostat setting above 70°F. Only two of the houses eventually operated without night set-back so that this had little effect on the average value of the eleven houses. One house (No. 6) operated with consistently lower than average temperatures (Figure 30). This was the only one of the group that had a radiant floor heating system.

Relative Humidity

The weekly average indoor relative humidity for all houses (dotted line on RH portion of Figures 25 to 35) ranges from a low of 35 per cent during January and February to a high of 65 per cent in late August.

The three houses that had humidifiers (House No. 1 - Figure 25, House No. 8 - Figure 32 and House No. 11 - Figure 35) did not have higher weekly average relative humidities during the winter than the average of the eleven houses. The relative humidity in these three houses, however, appeared to be slightly higher than in those houses without humidifiers or crawl spaces.

House Nos. 2, 3, 7, 9 (Figures 26, 27, 31, 33) were built on crawl spaces and used the crawl space as a warm-air plenum. These four houses operated with a higher relative humidity than most of the other houses probably because of moisture pick-up from the crawl space and because they were small, tight houses with good vapour barriers and very little infiltration or ventilation. In some of these houses excessive relative humidity did become a problem during the winter, and it was suggested that the homeowners use more ventilation. Where this suggestion was followed, the relative humidity dropped to a more reasonable level.

For the outdoor temperatures involved, most of the houses in the study group could have operated with a higher relative humidity without resulting condensation problems.

Humidity Ratio

In a general way, the monthly average humidity ratio of the indoor air follows the monthly average humidity ratio of the outdoor conditions (Figure 38). There is a very wide range between maximum monthly average values and minimum monthly average values for the first 6 months of the year. This wide range is due in part to the fact that for the first part of the year the records for eleven houses were used while for the latter part of the year the records for only four houses were involved. There appears to be very little lag between the outdoor and indoor conditions on a monthly basis.

In Figure 39, the outdoor monthly average humidity ratio was plotted against the indoor monthly average humidity ratio for four houses. The shape of the plot is not consistent in each case; each one does indicate, however, that usually by the month of July the monthly average outdoor humidity

ratio exceeds the indoor monthly average humidity ratio and remains so during August and September; during the rest of the year the reverse is true.

The weekly average indoor humidity ratio (Figures 25 to 35) for the heating season remains fairly constant with the low point of 35 grains per pound in February. The high point of 75 grains per pound occurs in August and September. The humidity ratio in House No. 6 (Figure 30), remained consistently above the average for all houses during the winter months because of excess water in the air passages of the floor heating system. This higher humidity ratio considerably raised the average for all eleven houses so that comparisons of the humidity ratio in individual houses with the eleven-house average should take this into account.

SUMMARY

Eleven houses of various types and of recent construction were instrumented in the Halifax metropolitan area. Weather records of the Halifax Weather Office were used as it is centrally located in relation to the houses under study.

The period covered 12 months starting in December 1960. During this period records of indoor temperature and relative humidity were collected using hygrothermographs in each house. These and the Weather Office records indicate:

1. The weekly average outdoor RH varied between 70 and 85 per cent over most of the period while the weekly average humidity ratio or air moisture content varied from a low of 5 grains per pound in February to a high of 85 grains per pound in July and August.

2. The weekly average indoor RH ranged from a low of 35 per cent in January and February to a high of 65 per cent in late August.

3. Changes in outdoor air moisture content were followed closely within a few hours by corresponding but smaller changes in inside air moisture content. The outdoor air moisture content was generally greater than the indoor air moisture content for July, August and September, when with windows open the materials inside the house would absorb a considerable amount of moisture; during the other 9 months the indoor air moisture content exceeded the outdoor air moisture content.

4. The indoor temperature was fairly uniform during the heating season ranging in weekly average from 66 to 69°F. The weekly average indoor temperature rose above this during

the summer when the outdoor temperature equalled or exceeded 66°F. Setting a lower temperature on the thermostat at night (night set-back) lowers the weekly average temperature to 66 to 68°F although the indoor temperature during the day is set for 70 to 72°F. In the few houses not employing night set-back and a thermostat setting of 70°F the weekly average indoor temperature ranged from 69 to 72°F.

5. Among the houses not built on crawl spaces, those equipped with "automatic humidifiers" did not maintain a higher average relative humidity during the winter than houses not so equipped.

6. Houses built on crawl space plenum systems maintained higher average relative humidities than the eleven-house average. In some instances the relative humidity was high enough to recommend increased ventilation in order to reduce it to tolerable limits.

A preliminary report was issued in May 1962 and copies were circulated to homeowners who participated in this survey (1).

REFERENCE

1. Robson, D. R. Indoor climate study, Halifax, N. S. (preliminary report). National Research Council, Division of Building Research, Technical Note No. 373, Ottawa, May 1962.

TABLE I

TABULATION OF AVERAGE MONTHLY RELATIVE HUMIDITY IN %
AND AVERAGE INDOOR TEMPERATURE IN °F FOR EACH HOUSE.
OUTSIDE CONDITION IS ALSO MONTHLY AVERAGE.

Month	1		2		3		4		5		6		7		8		9		10		11		Outside	
	RH	Temp.	RH	°F	RH	°F	RH	°F	RH	°F	RH	°F	RH	°F	RH	°F	RH	°F	RH	°F	RH	°F	RH	°F
Dec/60	50	68	50	68	57	68	41	68	39	68	62	65	59	66	39	68	56	67	38	68	43	68	78	30
Jan/61	40	67	40	65	41	69	38	67	33	68	57	65	52	67	41	66	46	69	28	68	34	68	78	22
Feb/61	39	68	38	66	41	68	32	71	37	68	57	64	46	64	36	66	42	70	27	68	30	68	77	24
Mar/61	38	69	36	65	48	64	35	69	40	66	59	64	49	66	39	66	43	69	28	68	34	68	77	29
Apr/61	41	68	39	68	53	67	38	71	46	67	63	65	53	67	47	66	51	69	33	68	40	67	81	38
May/61	45	68	44	69			41	70	53	67			54	71	53	66	57	67	44	69	46	67	79	48
June/61	49	69					52	69					54	72	59	66			56	70			78	57
July/61	-	-					55	70							58	67			62	71			82	63
Aug/61	54	72					58	73							61	71			60	70			80	67
Sept/61	49	71					57	73							57	68			60	70			83	64
Oct/61	50	69					50	70							58	66			51	69			85	53
Nov/61	46	69					51	68							55	64			42	69			86	44
Dec/61							43	66							47	64			35	68			78	33

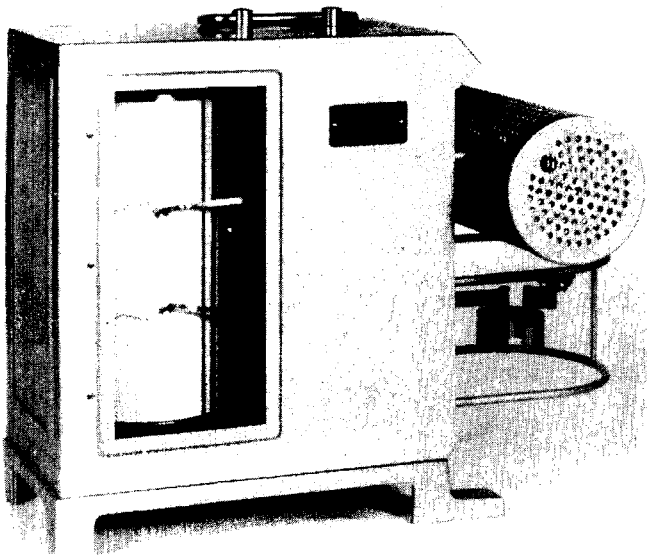


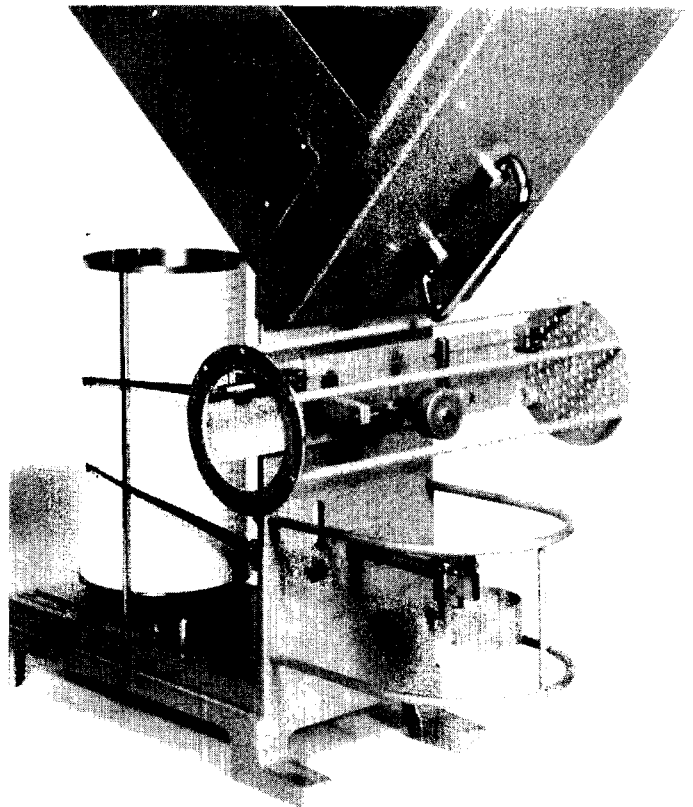
Figure 1

Top View

Hygrothermograph

Side View

Hygrothermograph
with guard removed
and case open.



House; approx yr. of constⁿ. 1928

Constⁿ; Frame ☒ Brick
Other _____

Exter. Wood ☒ Brick veneer
Other _____

Stories 1 Floor area 1670 sq
Roof; Gable _____ Hip _____ Flat ☒

Basement ☒ Crawl Space ☒ Slab
Insulation; ceiling seafelt 2"
walls seafelt 2"

Vapour barrier: ceiling aluminum foil
walls aluminum foil

Windows; Type Double
Glazing; double ☒ single _____
Material; frame wood
sash wood

Storm windows; yes _____ no _____
Weatherstripping; yes _____ no _____

Doors; Single storm ☒
Weatherstripping; yes ☒ no _____
Vestibule; front; yes _____ no ☒
rear; yes _____ no ☒

Basement; Full _____ Partial ☒
No. of rooms 2

Approx. height 8 _____ Ft.
Wall below grade 2 _____ Ft.

Heated ☒ unheated _____
Windows; Type wood frame
Glazing s ☒ d _____
Storms; yes _____ no ☒

Membrane under floor yes ☒ no _____
General condition; wet _____
damp _____
dry ☒

Name Hansen #1

Address Bellview - Halifax County

Children 4 Ages 19, 10, 8, 5

Heating System: Type forced warm air
Type of Fuel: Oil ☒ Coal _____ Gas _____
Furnace; Make _____
Capacity 100,000 Btu/hr.

Burner; Make _____
Capacity 0.85 gph at 14.5"

Controls; Thermostat; Type thermostat
Location hall way
Usual setting (day) 73 _____ °F
(night) 60 _____ °F

Fan Control settings:
On 140 °F Off 100 °F
Aquastat setting: _____ °F
High Limit setting: 240 °F

Chimney; outside ☒ inside _____
Fireplace; Standard ☒ Circulating _____
Damper; open when in use ☒
open at all times _____

Exhaust fan; None _____ Kitchen ☒ Bath _____
Cooking range; Type Electric
Humidifier: Type plate
Location above air plenum
Condition fair

Service Water Heater: Type Electric
Location Basement

Washer; Type Automatic
Location Basement

Dryer; Location Basement
Vented? Yes _____ No ☒ - not signed
Indoor line; Location Basement

FIGURE 2

House; approx yr. of constⁿ. 1960
 Constⁿ; Frame ☒ Brick _____
 Other _____
 Exter. Wood ☒ Brick veneer _____
 Other _____
 Stories 1 Floor area 865 sq
 Roof; Gable ☒ Hip _____ Flat _____
 Other _____
 Basement _____ Crawl Space ☒ Slab _____
 Insulation; ceiling 3" Insulation B.H.
 walls 2" " " "
 Vapour Barrier: ceiling ☒ polyeth. line
 walls ☒ " " "
 Windows; Type metal
 Glazing; double ☒ single _____
 Material; frame wood
 sash metal
 Storm windows; yes ☒ no _____
 Weatherstripping; yes ☒ no _____
 Doors; Single _____ storm ☒ _____
 Weatherstripping; yes ☒ no _____
 Vestibule; front; yes _____ no ☒
 rear; yes _____ no ☒
 Basement; Full ☒ Partial no
 No. of rooms _____
 Approx. height _____ Ft.
 Wall below grade _____ Ft.
 Heated _____ unheated _____
 Windows; Type _____
 Glazing s _____ d _____
 Storms; yes _____ no _____
 Membrane under floor yes ☒ no _____
 General condition; wet _____
 damp _____
 dry ☒

Name same #2
 Address Dartmouth
 Children 2 Ages 4, 2
 Heating System: Type forced warm air
 Type of Fuel: Oil ☒ Coal _____ Gas _____
 Furnace; Make _____
 Capacity 75,000 Btu/hr.
 Burner; Make _____
 Capacity 0.75 gph. (U.S.)
 Controls; Thermostat; Type standard
 Location living room
 Usual setting (day) 70 °F
 (night) 68 °F
 Fan Control settings:
 On 140 °F Off 120 °F
 Aquastat setting: _____ °F
 High Limit setting 200 °F
 Chimney; outside _____ inside ☒ metal
 Fireplace; Standard _____ Circulating _____
 Damper; open when in use _____
 open at all times _____
 Exhaust fan; None _____ Kitchen _____ Bath ☒
 Cooking range; Type electric
 Humidifier: Type _____
 Location _____
 Condition _____
 Service Water Heater: Type electric
 Location utility room
 Washer; Type Whirlpool
 Location utility room
 Dryer; Location no
 Vented? Yes _____ No _____
 Indoor line; location _____

FIGURE 3

House; approx yr. of constⁿ. 1958
 Constⁿ; Frame Brick
 Other _____
 Exter. Wood Brick veneer
 Other _____
 Stories 1 Floor area 810 sq
 Roof; Gable Hip Flat _____
 Other _____
 Basement no Crawl Space yes Slab _____
 Insulation; ceiling 3" Polystyrene Batt
 walls 2" Polystyrene Batt
 Vapour Barrier: ceiling no
 walls _____
 Windows; Type double
 Glazing; double x single _____
 Material; frame wood
 sash metal
 Storm windows; yes x no _____
 Weatherstripping; yes x no _____
 Doors; Single storm x
 Weatherstripping; yes x no _____
 Vestibule; front; yes _____ no x
 rear; yes _____ no x
 Basement; Full _____ Partial _____
 No. of rooms _____
 Approx. height _____ Ft.
 Wall below grade _____ Ft.
 Heated _____ unheated _____
 Windows; Type _____
 Glazing s _____ d _____
 Storms; yes _____ no _____
 Membrane under floor yes _____ no _____
 General condition; wet _____
 damp _____
 dry _____

Name House # 3.
 Address Danvers, N.H.
 Children 0 Ages _____
 Heating System: Type Forced Warm Air
 Type of Fuel: Oil x Coal _____ Gas _____
 Furnace; Make _____
 Capacity 75,000 Btu / hr.
 Burner; Make _____
 Capacity 0.75 gph (4.8)
 Controls; Thermostat; Type standard
 Location Living Room
 Usual setting (day) 74 °F
 (night) 72 °F
 Fan Control settings:
 On 140 °F Off 120 °F
 Aquastat setting: _____ °F
 High Limit setting: 200 °F
 Chimney; outside _____ inside x (metal)
 Fireplace; Standard _____ Circulating _____
 Damper; open when in use _____
 open at all times _____
 Exhaust fan; None _____ Kitchen _____ Bath x
 Cooking range; Type Electric
 Humidifier; Type no
 Location _____
 Condition _____
 Service Water Heater; Type Electric
 Location Utility Room
 Washer; Type Washer
 Location Utility Room
 Dryer; Location no
 Vented? Yes _____ No _____
 Indoor line; location _____

FIGURE 4

House; approx yr. of constⁿ. 1924

Constⁿ; Frame ☒ Brick
Other _____

Exter. Wood ☒ Brick veneer
Other _____

Stories 1 1/2 Floor area 1023 sq

Roof; Gable ☒ Hip _____
Other _____ Flat

Basement ☒ Crawl Space _____ Slab _____

Insulation; ceiling 2"
walls 2"

Vapour Barrier: ceiling _____
walls _____

Windows; Type Double hung
Glazing; double single
Material; frame wood
sash wood

Storm windows; yes ☒ no _____

Weatherstripping; yes ☒ no _____

Single storm
Weatherstripping; yes ☒ no _____

Vestibule; front; yes ☒ no _____
rear; yes ☒ no _____

Basement; Full ☒ Partial _____
No. of rooms _____

Approx. height 7-6 ft.
Wall below grade 0" ft.

Heated ☒ unheated _____

Windows; Type double
Glazing s ☒ d _____

Storms; yes ☒ no _____

Membrane under floor yes ☒ no _____

General condition; wet _____
damp _____
dry ☒

Name W. J. Jones

Address 1234 Main St.

Children 2 Ages 6, 4

Heating System: Type Steam hot water

Type of Fuel: Oil ☒ Coal _____ Gas _____

Furnace; Make _____ Capacity _____

Burner; Make _____ Capacity 100 sq ft (w. d.)

Controls; Thermostat; Type automatic
Location Dining room
Usual setting (day) 72 °F
(night) 72 °F

Fan Control settings: On ☒ Off ☒
Aquastat setting: 180 °F
High Limit setting: 200 °F

Chimney; outside inside
Fireplace; Standard Circulating
Damper; open when in use
open at all times _____

Exhaust fan; None ☒ Kitchen _____ Bath _____

Cooking range; Type Electric

Humidifier; Type no Location _____ Condition _____

Service Water Heater: Type Electric & Hot Water
Location basement

Washer; Type Electric
Location basement

Dryer; Location basement
Vented? Yes ☒ No _____

Indoor line; location basement

FIGURE 5

House; approx yr. of constⁿ. 1966

Constⁿ; Frame ☒ Brick
Other ☐

Exter. Wood ☒ Brick veneer
Other ☐

Stories 1 Floor area 750 sq ft

Roof; Gable ☒ Hip ☐ Flat ☐
Other ☐

Basement ☐ Crawl Space ☒ Slab

Insulation; ceiling 3" Insulation
walls 2" Insulation

Vapour barrier: ceiling yes
walls yes

Windows; Type Double
Glazing; double ☒ single ☐
Material; frame wood
sash wood
Storm windows; yes ☐ no ☐
Weatherstripping; yes ☐ no ☐
Single ☒ storm ☐
Weatherstripping; yes ☒ no ☐
Vestibule; front; yes ☐ no ☒
rear; yes ☐ no ☒

Basement; Full ☐ Partial ☐
No. of rooms 1

Approx. height 8 Ft.
Wall below grade unheated Ft.
Heated unheated

Windows; Type double
Glazing s d
Storms; yes ☒ no ☐
Membrane under floor yes ☐ no ☐
General condition; wet ☐ damp ☐ dry ☒

Name John = 5

Address Bethesda

Children 1 Ages 14

Heating System: Type Forced Warm Air

Type of Fuel: Oil ☒ Coal ☐ Gas ☐

Furnace; Make —
Capacity 81,000 Btu/hr

Burner; Make —
Capacity 6.75 gph at 8

Controls; Thermostat; Type 2-stage
Location Living Room
Usual setting (day) 72 of
(night) 68 of

Fan Control settings:
On 10.5 of Off 9.5 of

Aquastat setting — of
High Limit setting 200 of

Chimney; outside inside insulated

Fireplace; Standard — Circulating —
Damper; open when in use —
open at all times —

Exhaust fan; None ☒ Kitchen ☐ Bath ☐

Cooking range; Type Electric

Humidifier: Type no
Location —
Condition —

Service Water Heater: Type Electric
Location Utility Room

Washer; Type Manual
Location Utility Room

Dryer; Location no
Vented? Yes ☐ No ☐

Indoor line; Location Utility Room

FIGURE 6

House; approx yr. of constⁿ. 1954-

Constⁿ; Frame Brick

Other concrete block

Exter. Wood Brick veneer

Other concrete block

Stories 1 Floor area 2630

Roof; Gable Hip Flat Flat

Other Other

Basement Crawl Space Slab X

Insulation; ceiling 2" walls no

Vapour barrier: ceiling yes walls medium to heavy

Windows; Type FIXED

Glazing; double X single -

Material; frame wood

sash wood

Storm windows; yes no

Weatherstripping; yes no

Single X storm -

Weatherstripping; yes no

Vestibule; front; yes no

rear; yes no

Partial -

Basement; Full -

No. of rooms -

Approx. height - Ft.

Wall below grade - Ft.

Heated -

Windows; Type -

Glazing s d

Storms; yes no

Membrane under floor yes X no -

General condition; wet -

damp X dry X

Name Lawrence #6

Address Bellevue Station

Children 7 Ages 14 1 1/2

Heating System: Type forced warm air - radiators

Type of Fuel: Oil X Coal - Gas -

Furnace; Make - Capacity -

Burner; Make - Capacity -

Controls; Thermostat; Type thermostat

Location basement

Usual setting (day) 68 (night) 68

Fan Control settings: On 120 Off 90

Aquastat setting: -

High Limit setting 130

Chimney; outside inside

Fireplace; Standard X Circulating -

Damper; open when in use X

open at all times -

Exhaust fan; None X Kitchen - Bath -

Cooking range; Type Electric

Humidifier: Type no Location - Condition -

Service Water Heater: Type Electric

Location basement

Washer; Type Electric

Location basement

Dryer; Location basement

Vented? Yes X No -

Indoor line; location -

FIGURE 7

House; approx yr. of constⁿ. 1958

Constⁿ; Frame ☒ Brick
Other ☐

Exter. Wood ☒ Brick veneer
Other ☐

Stories 1 Floor area 840 A

Roof; Gable 1 Hip ☐ Flat ☐
Other ☐

Basement no Crawl Space slab

Insulation; ceiling 3" batt
walls 2" batt

Vapour Barrier: ceiling poly ethylene
walls " "

Windows; Type double
Glazing; double ☐ single ☒
Material; frame wood
sash wood

Storm windows; yes ☒ no ☐
Weatherstripping; yes ☒ no ☐

Doors; Single storm
Weatherstripping; yes ☒ no ☐
Vestibule; front; yes ☐ no ☒
rear; yes ☐ no ☒

Basement; Full ☐ Partial ☐
No. of rooms 3
Approx. height 8 ft.
Wall below grade unheated ft.

Heated Windows; Type double
Glazing 8 d
Storms; yes ☐ no ☒

Membrane under floor yes ☒ no ☐
General condition; wet ☐ damp ☒ dry ☐

Name Smith # 7
Address 2101 1st St N.E.
Children 2 Ages 4, 3

Heating System: Type Down Warm Air
Type of Fuel: Oil ☒ Coal ☐ Gas ☐
Furnace; Make Wesco Capacity 150 Btu/hr

Burner; Make Wesco Capacity 150 Btu/hr
Controls; Thermostat; Type mercurial
Location down stairs
Usual setting (day) 71 °F
(night) 71 °F

Fan Control settings:
On 140 °F Off 120 °F
Aquastat setting 180 °F
High Limit setting 200 °F

Chimney; outside inside metal
Fireplace; Standard Circulating
Damper; open when in use ☐
open at all times ☐

Exhaust fan; None Kitchen Bath ☒
Cooking range; Type Electric
Humidifier: Type no Location no

Service Water Heater: Type Electric
Location down stairs

Washer; Type down stairs Location down stairs
Dryer; Location no
Vented? Yes ☐ No ☒

Indoor line; Location down stairs

FIGURE 8

House; approx yr. of constⁿ. 1950
 Constⁿ; Frame ☒ Brick _____
 Other _____
 Exter. Wood ☒ Brick veneer _____
 Other _____
 Stories 1 1/2 Floor area 2113 ft.²
 Roof; Gable _____ Hip ☒ Flat _____
 Other _____
 Basement ☒ Crawl Space _____ Slab _____
 Insulation; ceiling 5" _____
 walls 2" _____
 Vapour Barrier: ceiling _____
 walls _____
 Windows; Type Double hung _____
 Glazing; double _____ single ☒ _____
 Material; frame Wood _____
 sash Wood _____
 Storm windows; yes ☒ no _____
 Weatherstripping; yes _____ no _____
 Doors; Single _____ storm ☒ _____
 Weatherstripping; yes _____ no _____
 Vestibule; front; yes ☒ no _____
 rear; yes _____ no _____
 Basement; Full ☒ Partial _____
 No. of rooms _____
 Approx. height _____ Ft.
 Wall below grade _____ Ft.
 Heated ☒ unheated _____
 Windows; Type _____
 Glazing s _____ d _____
 Storms; yes _____ no _____
 Membrane under floor yes _____ no _____
 General condition; wet _____
 damp _____
 dry ☒

Name James S
 Address Hillside
 Children 4 Ages 14, 9, 7, 6
 Heating System: Type Forced warm air
 Type of Fuel: Oil ☒ Coal _____ Gas _____
 Furnace; Make _____
 Capacity 12.5 cu ft/hr
 Burner; Make _____
 Capacity 5.75 gph U.S.
 Controls; Thermostat; Type Standard
 Location Hall
 Usual setting (day) 70 °F
 (night) 65 °F
 Fan Control settings:
 On 100 °F Off 80 °F
 Aquastat setting: _____ °F
 High Limit setting: 250 °F
 Chimney; outside _____ inside ☒ _____
 Fireplace; Standard _____ Circulating _____
 Damper; open when in use ☒ _____
 open at all times _____
 Exhaust fan; None ☒ Kitchen _____ Bath _____
 Cooking range; Type Electric
 Humidifier; Type Electric
 Location Warm air blower
 Condition good
 Service Water Heater: Type Electric
 Location Basement
 Washer; Type Washing
 Location Basement
 Dryer; Location Basement
 Vented? Yes _____ No ☒ _____
 Indoor line; location _____

FIGURE 9

House; approx yr. of constⁿ. 1960
 Constⁿ; Frame ☒ Brick
 Other ☐
 Exter. Wood ☒ Brick veneer
 Other ☐
 Stories 1 floor area 3659
 Roof; Gable ☒ Hip ☐ Flat
 Other ☐
 Basement Crawl space Slab
 Insulation; ceiling 3" Batt
 walls 3" Batt
 Vapour barrier: ceiling ☒ walls ☒
 Windows; Type ☒ double single
 Glazing; double ☒ single ☒
 Material; frame ☒ sash ☒
 Storm windows; yes ☒ no
 Weatherstripping; yes ☒ no
 Doors; Single storm ☒
 Weatherstripping; yes ☒ no
 Vestibule; front; yes ☒ no
 rear; yes ☒ no
 Basement; Full ☒ Partial ☐
 No. of rooms ☒
 Approx. height ☒ Ft.
 Wall below grade ☒ Ft.
 Heated ☒
 Windows; Type ☒ unheated
 Glazing ☒ d
 Storms; yes ☒ no
 Membrane under floor yes ☒ no
 General condition; wet ☒ damp ☒ dry ☒

Name Stearns #4
 Address 2400 14th St
 Children 2 Ages 5
 Heating System: Type Gas
 Type of Fuel: Oil ☒ Coal ☐ Gas
 Furnace; Make Gas
 Capacity 75
 Burner; Make Stearns
 Capacity 0.75 gph
 Controls; Thermostat; Type expansion
 Location Living Room
 Usual setting (day) 70-72 of
 (night) 68 of
 Fan Control settings:
 On 14 F Off 130 of
 Aquastat setting 130 of
 High Limit setting 130 of
 Chimney; outside inside
 Fireplace; Standard no Circulating no
 Damper; open when in use
 open at all times
 Exhaust fan; None ☒ Kitchen ☐ Bath ☒
 Cooking range; Type Electric
 Humidifier; Type none
 Location Living Room
 Condition Good
 Service Water Heater; Type Electric
 Location Living Room
 Washer; Type Electric
 Location Living Room
 Dryer; Location no
 Vented? Yes ☒ No
 Indoor line; location Living Room

FIGURE 10

House; approx yr. of constⁿ. 1910

Constⁿ; Frame X Brick

Other

Exter. Wood X Brick veneer

Other

Stories 2

Roof; Gable X Hip Flat

Other

Basement X Crawl Space Slab

Insulation; ceiling walls

Vapour barrier: ceiling X walls

Windows; Type Double Single Sliding

Glazing; double single X

Material; frame wood

sash metal

Storm windows; yes no X

Weatherstripping; yes no

Doors; Single X storm X

Weatherstripping; yes X no

Vestibule; front; yes no X

rear; yes no X

Basement; Full X Partial

No. of rooms

Approx. height 8' Ft.

Wall below grade 7' Ft.

Heated X unheated

Windows; Type Double Single Sliding

Glazing s d

Storms; yes no

Membrane under floor yes no X

General condition; wet

damp

dry X

note - full basement not as shown in sketch - 1st. report figure type of frame

11/10/10

Name

Address

Children Ages

Heating System: Type Steam Hot Water

Type of Fuel: Oil Coal Gas

Furnace; Make

Capacity

Burner; Make

Capacity

Controls; Thermostat; Thermostat

Location Living Room

Usual setting (day) 73 °F

(night) 66 °F

Fan Control settings: On 105 °F Off 95 °F

Aquastat setting

High Limit setting 130 °F

Chimney; outside Inside X

Fireplace; Standard Circulating

Damper; open when in use X

open at all times

Exhaust fan; None X Kitchen Bath

Cooking range; Type Electric

Humidifier; Type Location

Condition

Service Water Heater: Type Electric

Location Bathroom

Washer; Type Location

Dryer; Location

Vented? Yes No

Indoor line; Location

FIGURE 11

House; approx yr. of const. 1911

Constⁿ; Frame Brick

Other Brick veneer

Enter. Wood Brick veneer

Other Brick veneer

Stories 1 Floor area 1000

Roof; Gable Hip Flat Flat

Other Other

Basement X Crawl Space Slab

Insulation; ceiling 9" walls 9"

Vapour barrier: ceiling 1 walls 1

Windows; Type Double single

Glazing; double single

Material; frame wood

sash wood

Storm windows; yes no

Weatherstripping; yes no

Doors; Single storm

Weatherstripping; yes no

Vestibule; front; yes no

rear; yes no

Basement; Full X Partial Partial

No. of rooms 5

Approx. height 8 ft.

Wall below grade 10 ft.

Heated X unheated unheated

Windows; Type double single

Glazing s d

Storms; yes no

Membrane under floor yes no

General condition; wet damp

dry dry

Name John J. Smith

Address 1111 1st St. N. W.

Children 2 Ages 10 8

Heating System: Type Hot Water Air

Type of Fuel: Oil Coal Gas Gas

Furnace; Make Wards

Capacity 112 112

Burner; Make Wards

Capacity 1 1

Controls; Thermostat; Type Hot Water

Location Living Room

Usual setting (day) 64-72 Off

(night) 64-72 Off

Fan Control settings: On Off Off Off Off

Aquastat setting: 64 64

High Limit setting: 64 64

Chimney; outside inside

Fireplace; Standard Circulating

Damper; open when in use X

open at all times open at all times

Exhaust fan; None Kitchen Bath

Cooking range; Type Electric

Humidifier: Type Electric

Location Living Room

Condition Good

Service Water Heater: Type Electric

Location Living Room

Washer; Type Electric

Location Living Room

Dryer; Location Living Room

Vented? Yes No

Indoor line; location Living Room

FIGURE 12

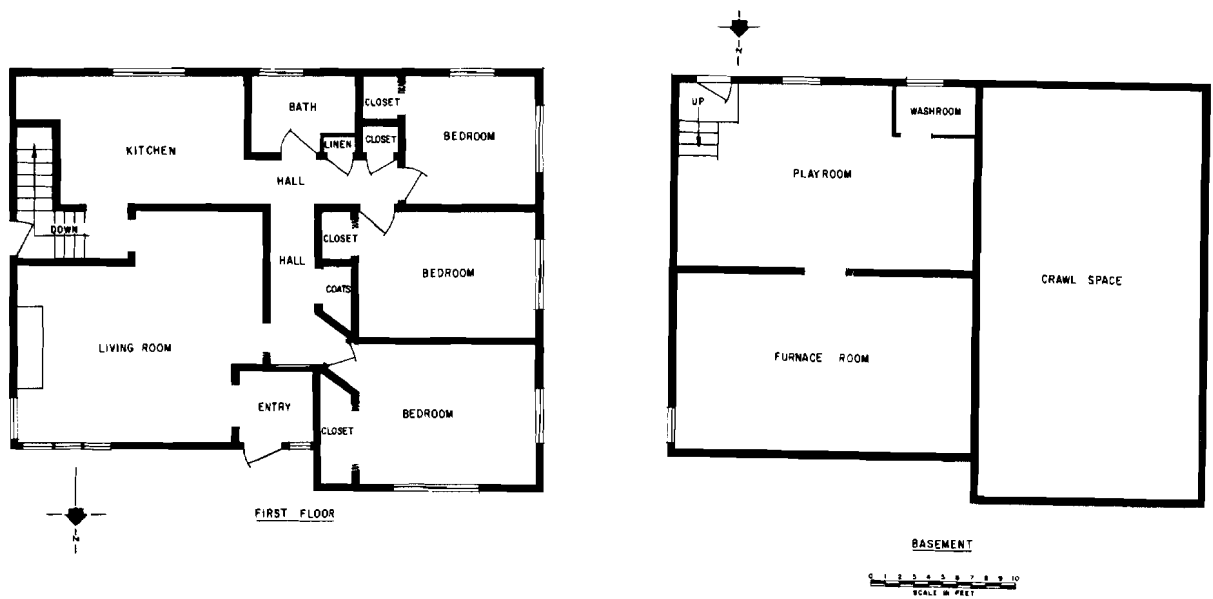


Figure 13 House No. 1

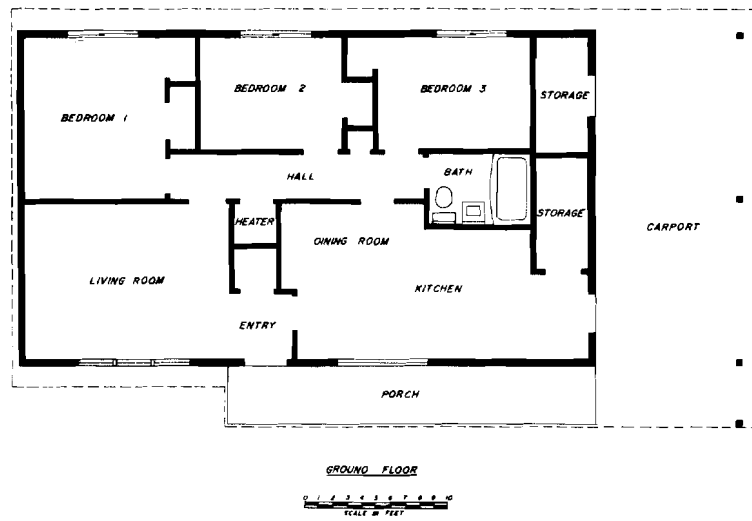


Figure 14 House No. 2

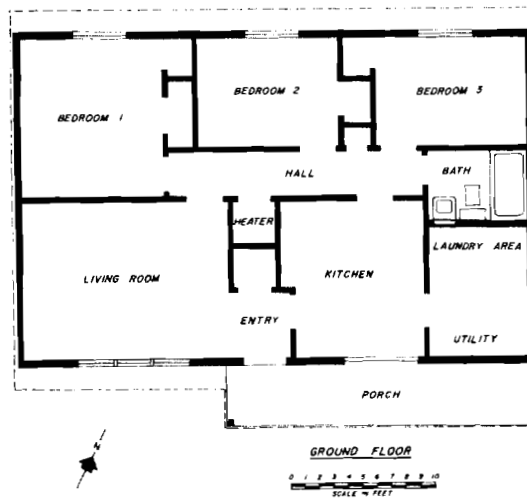


Figure 15 House No. 3

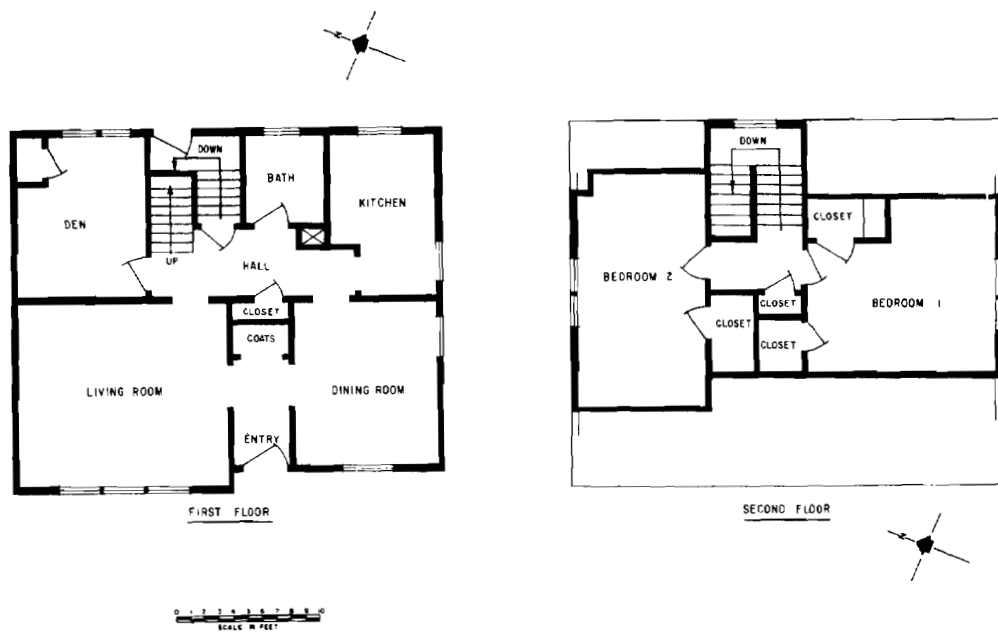


Figure 16 House No. 4

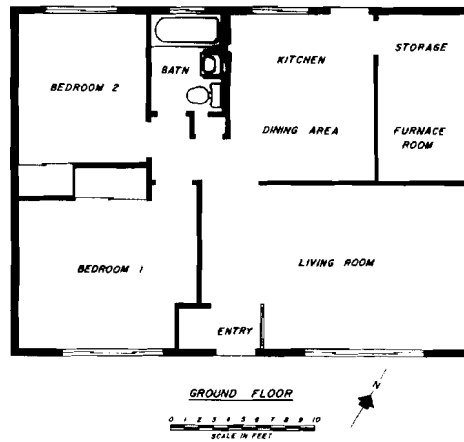


Figure 17 House No. 5

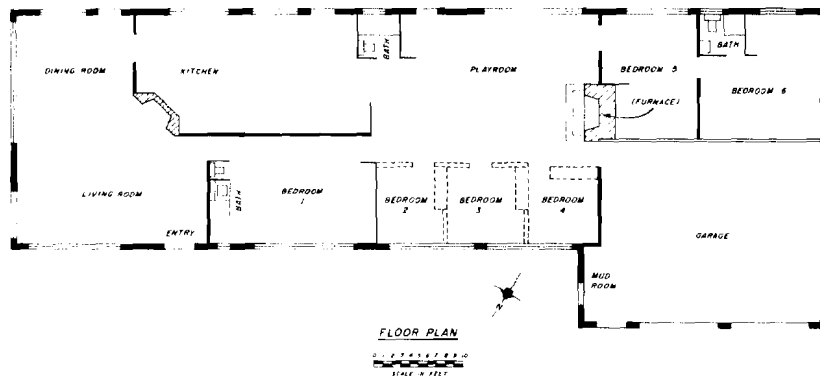


Figure 18 House No. 6

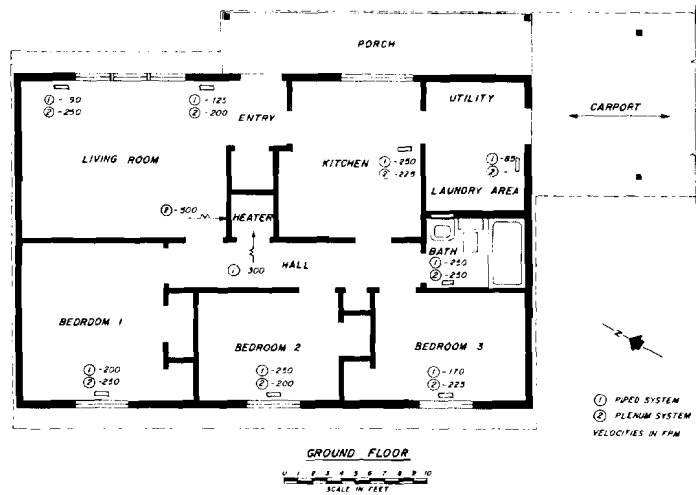


Figure 19 House No. 7

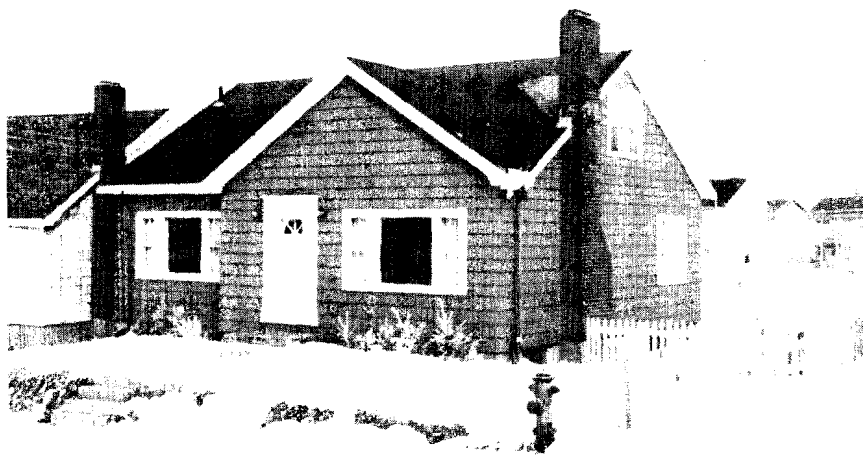
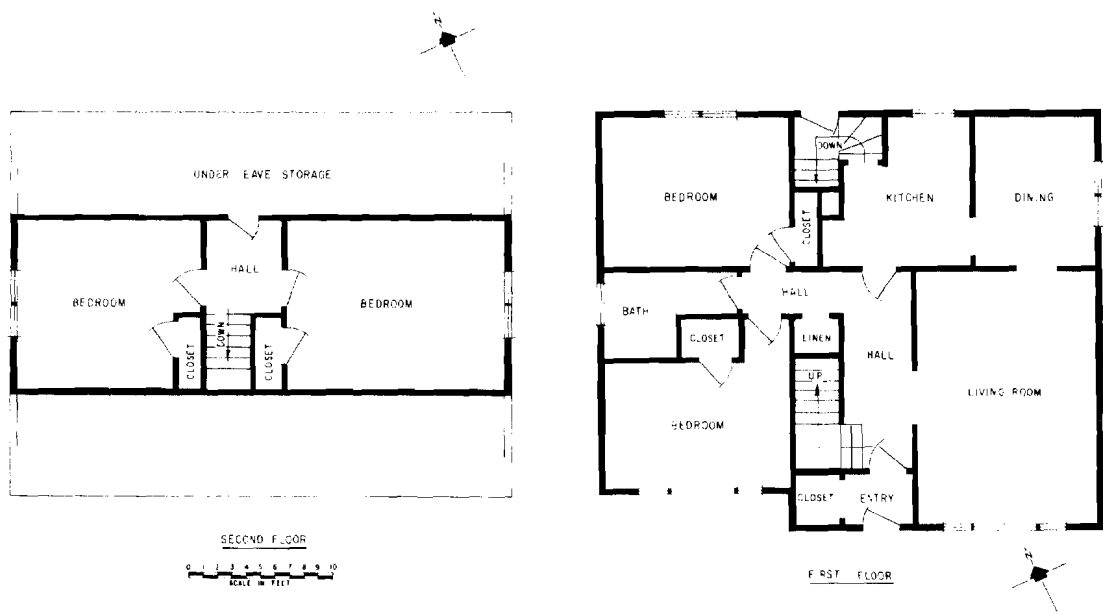


Figure 20 House No. 8

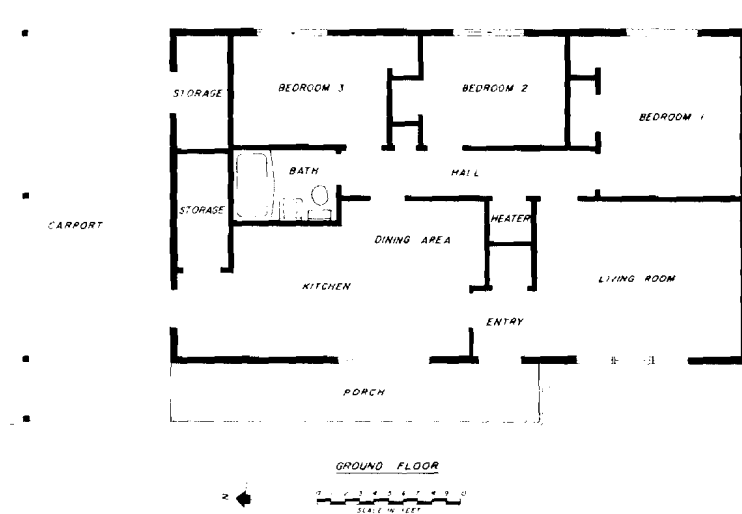


Figure 21 House No. 9

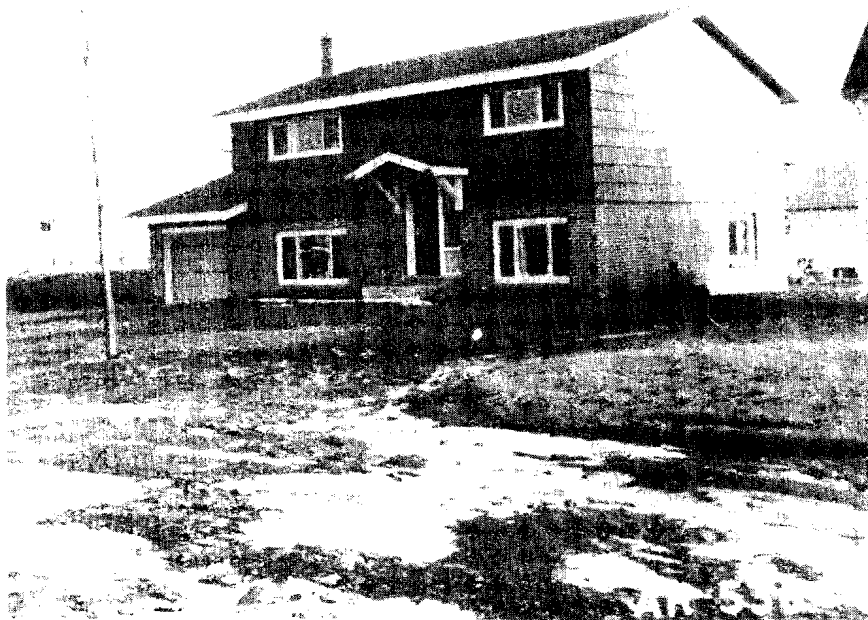
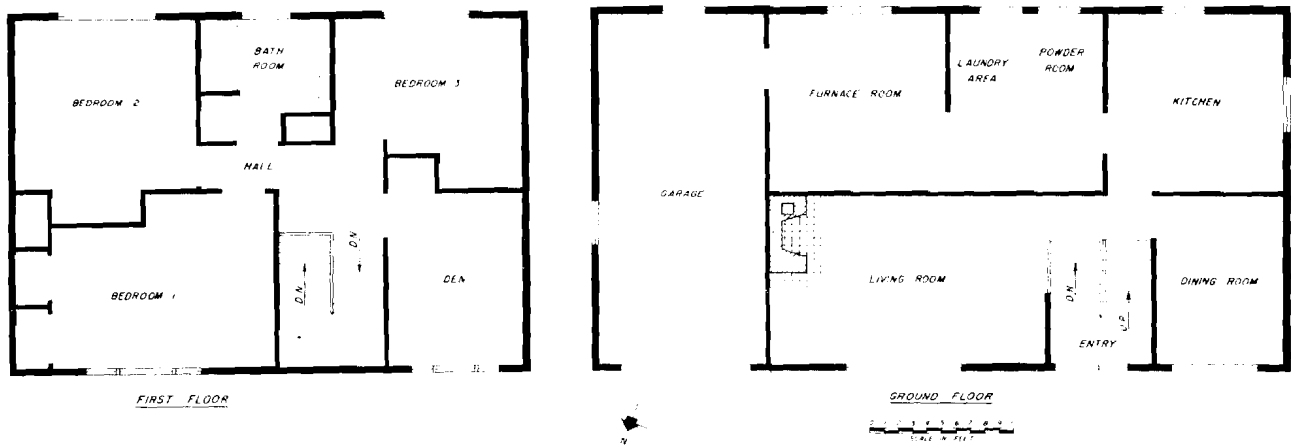


Figure 22 House No. 10

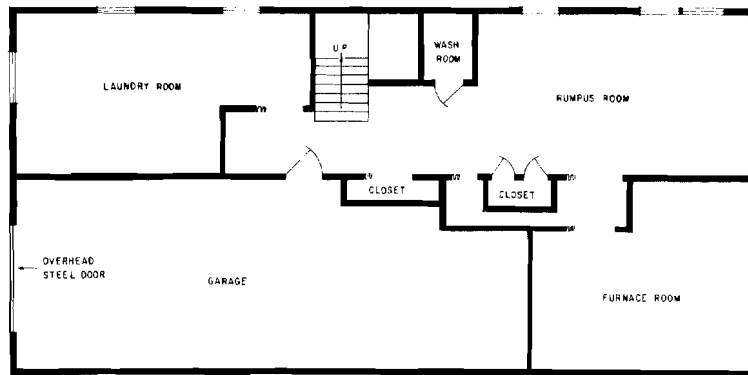
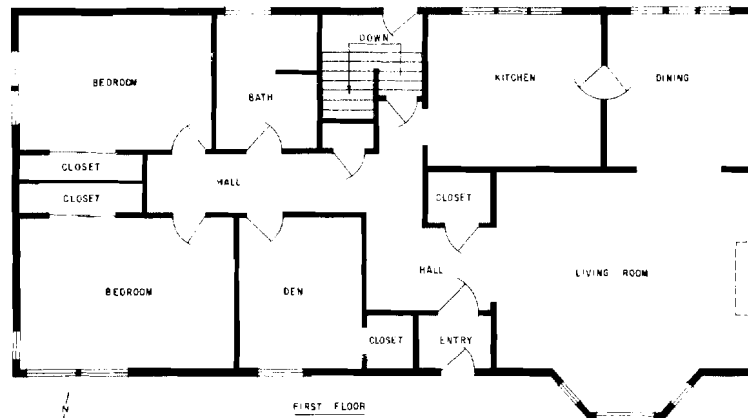


Figure 23 House No. 11

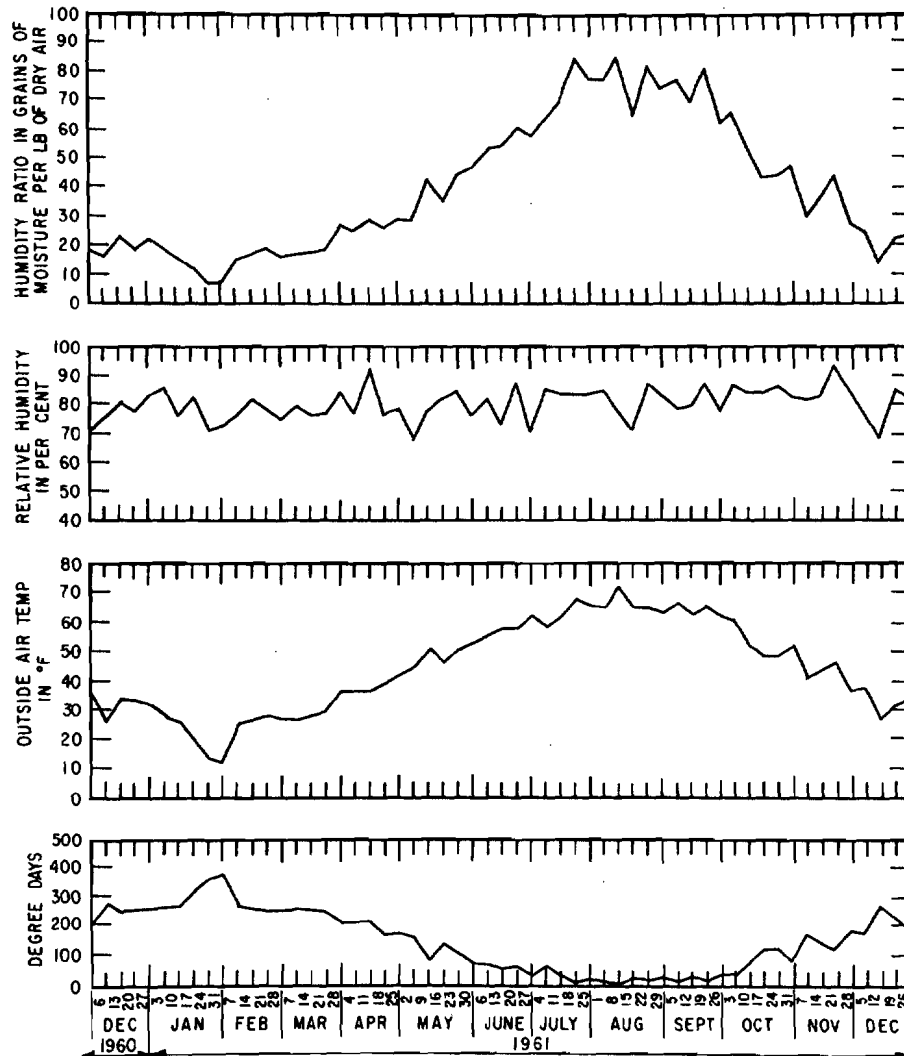


FIGURE 24 OUTDOOR CONDITIONS

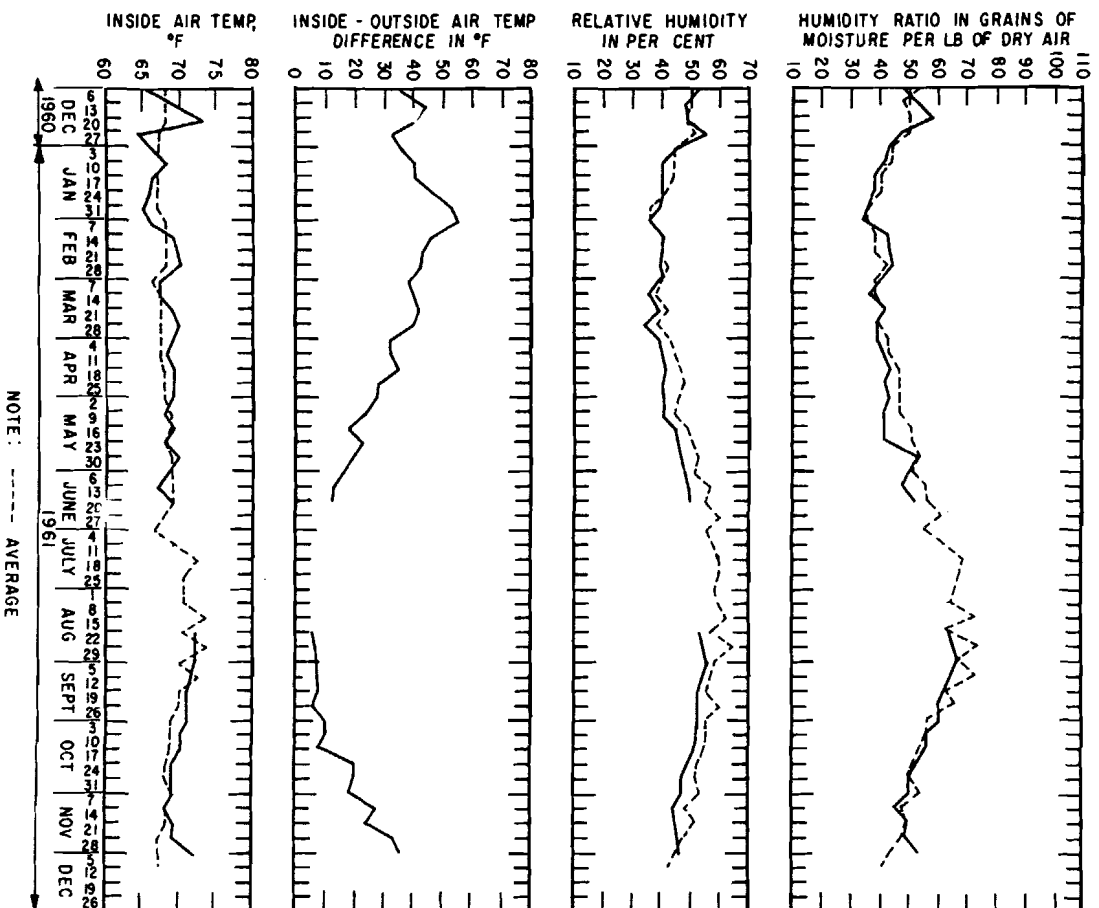


FIGURE 25

HOUSE No. 1

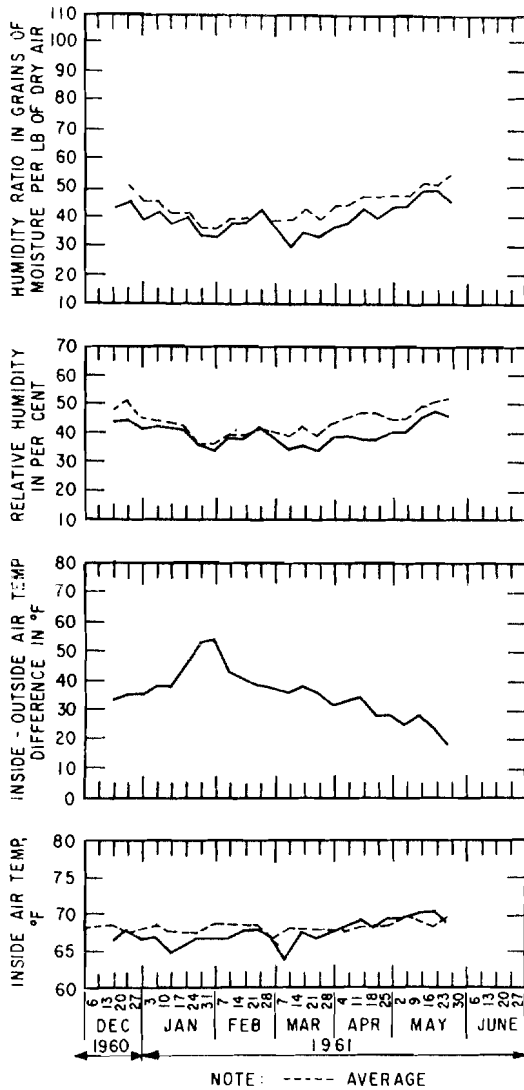


FIGURE 26 HOUSE No. 2

BR. 2811 - 3

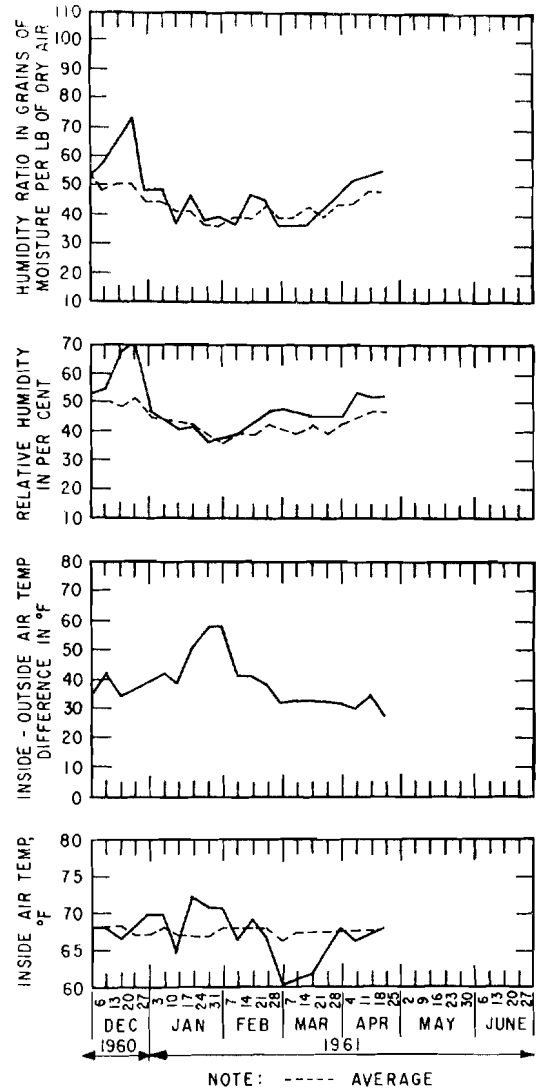


FIGURE 27 HOUSE No. 3

BR. 2811 - 4

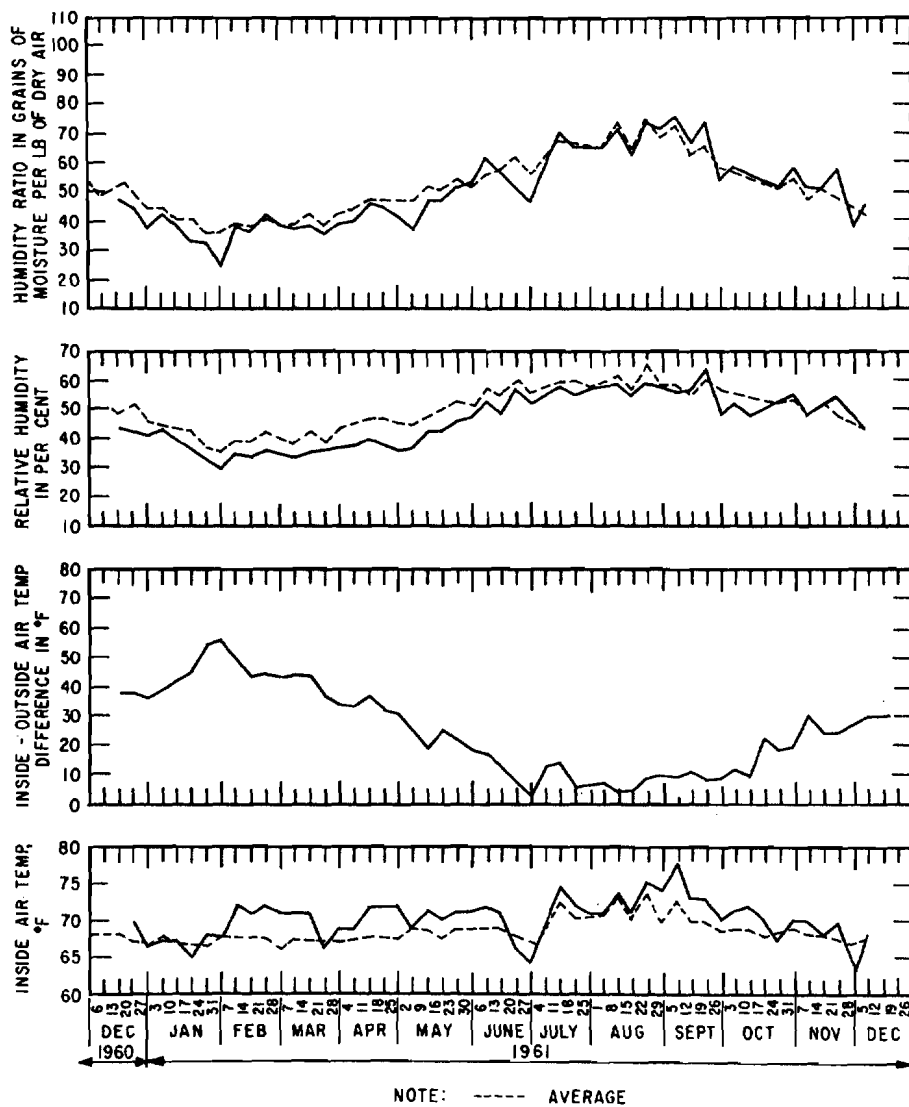


FIGURE 28

HOUSE No. 4

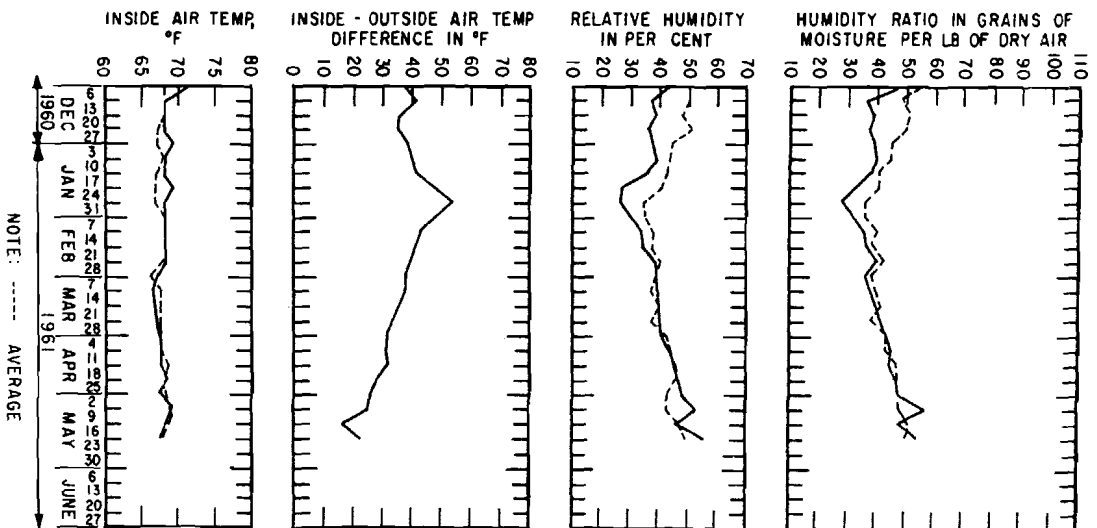


FIGURE 29 HOUSE No. 5

BR 2011-6

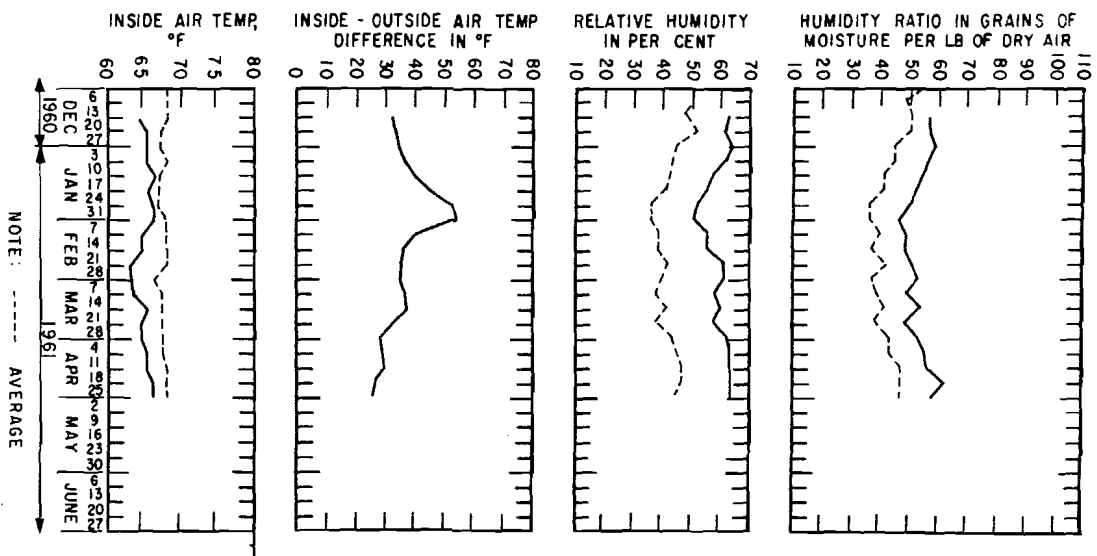


FIGURE 30 HOUSE No. 6

BR 2011-7

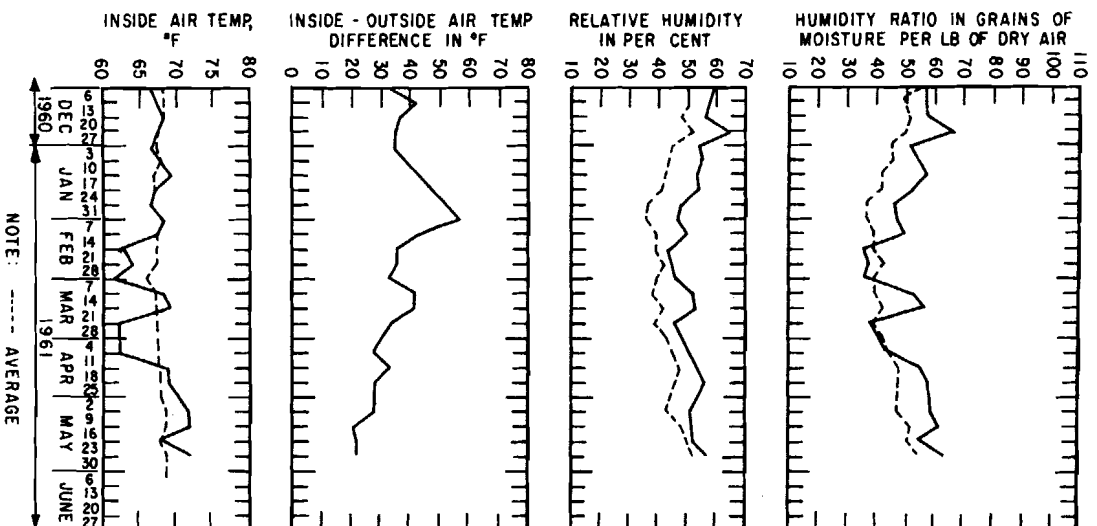


FIGURE 31 HOUSE No. 7

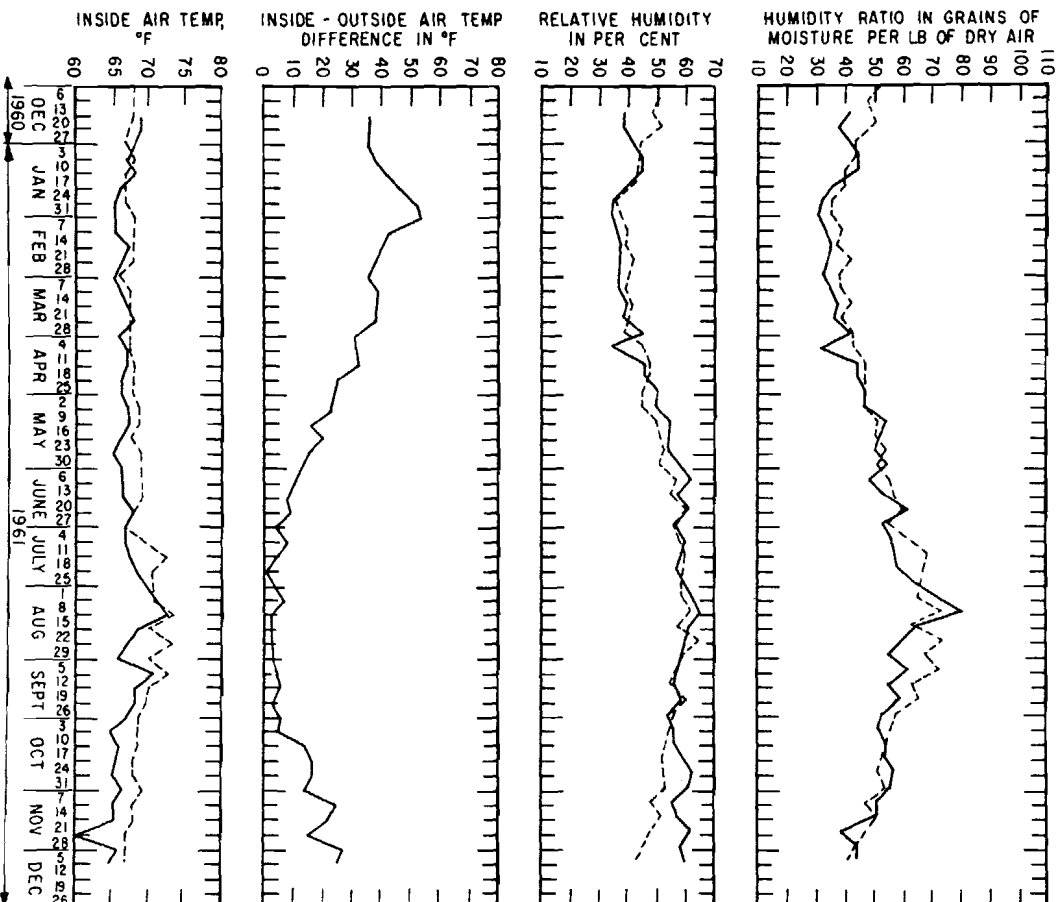


FIGURE 32 HOUSE No. 8

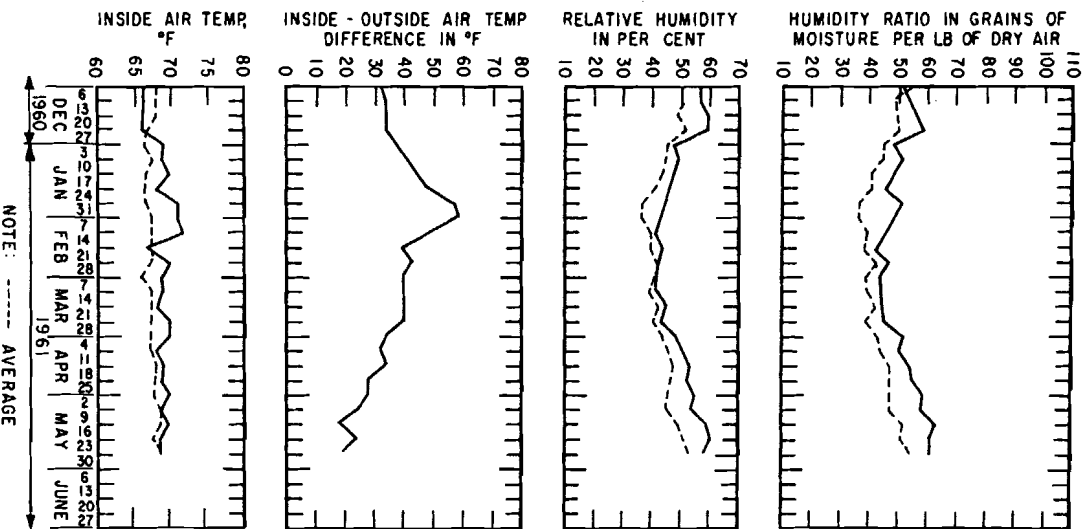
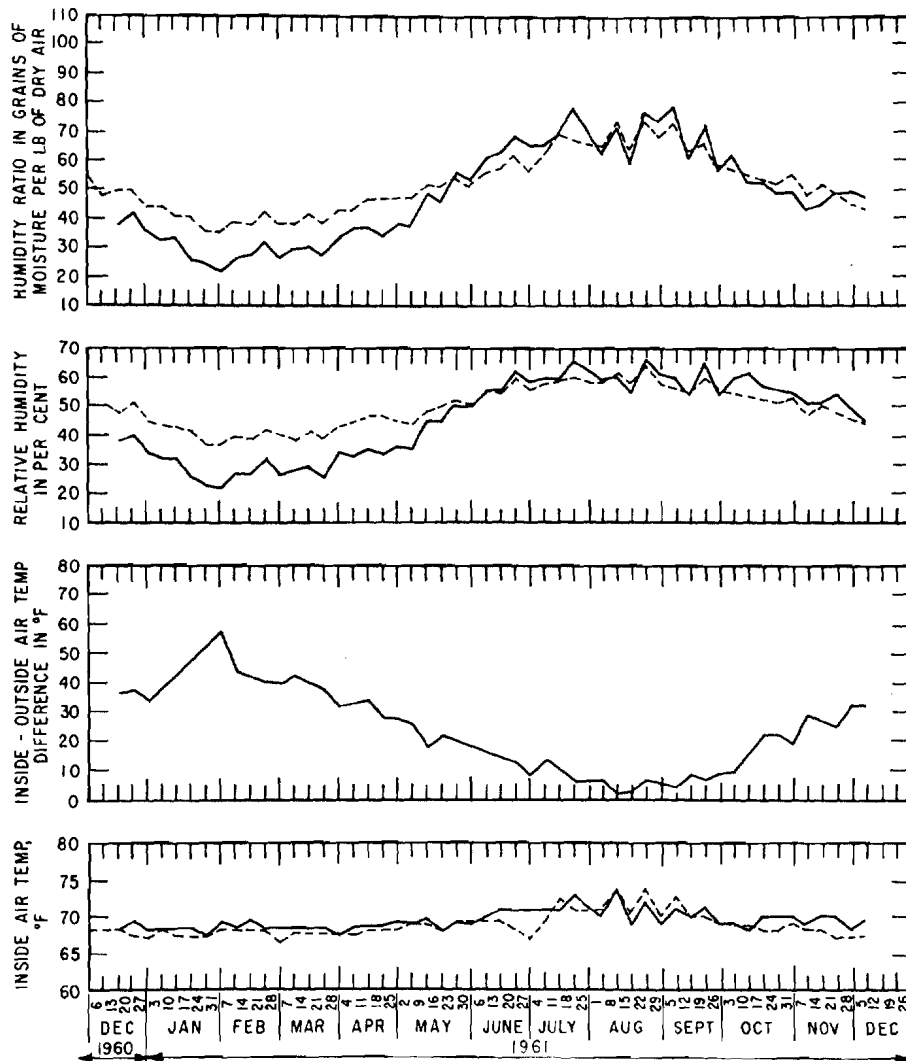


FIGURE 33 HOUSE No. 9



NOTE: ----- AVERAGE

FIGURE 34

HOUSE No. 10

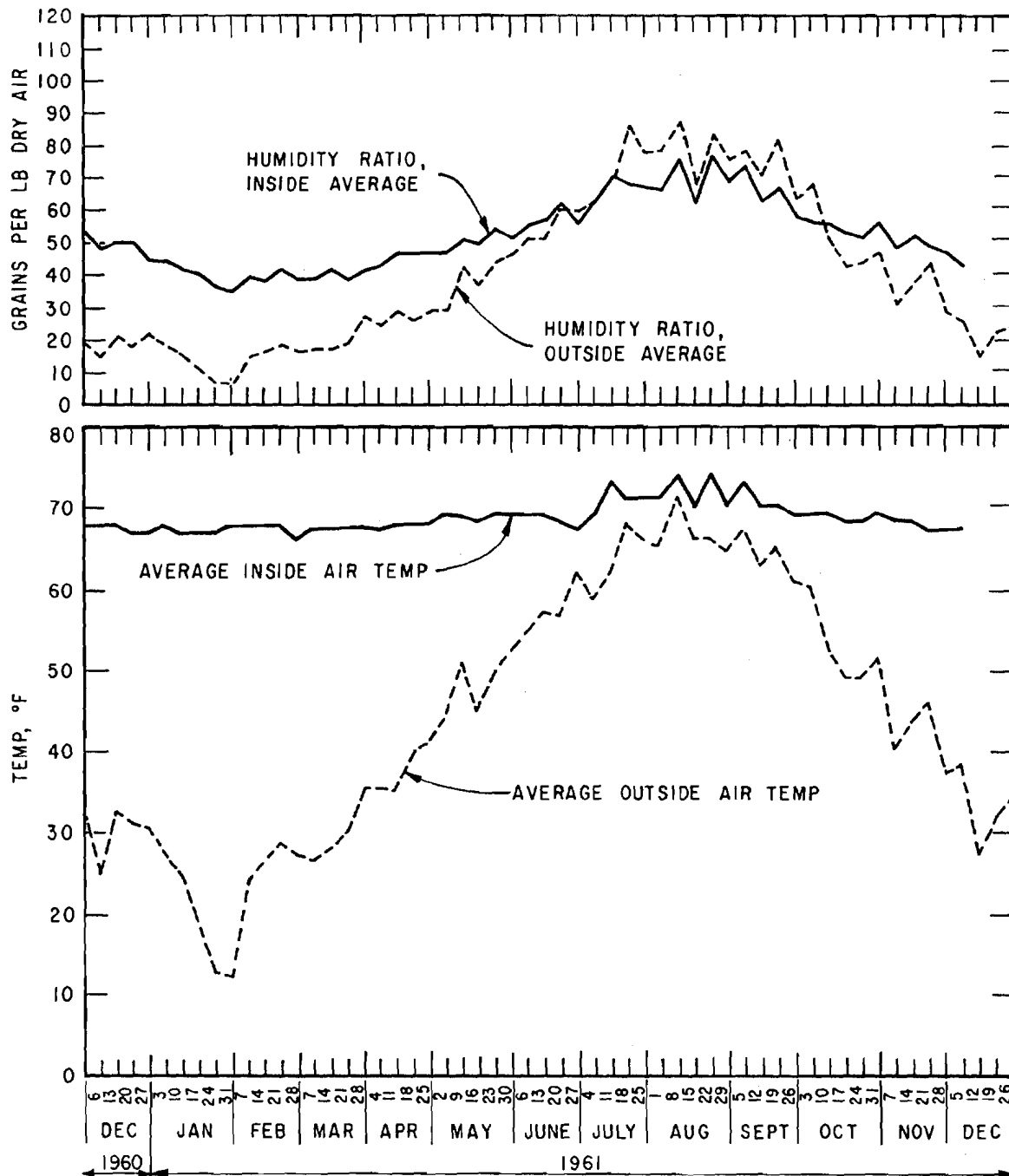


FIGURE 36

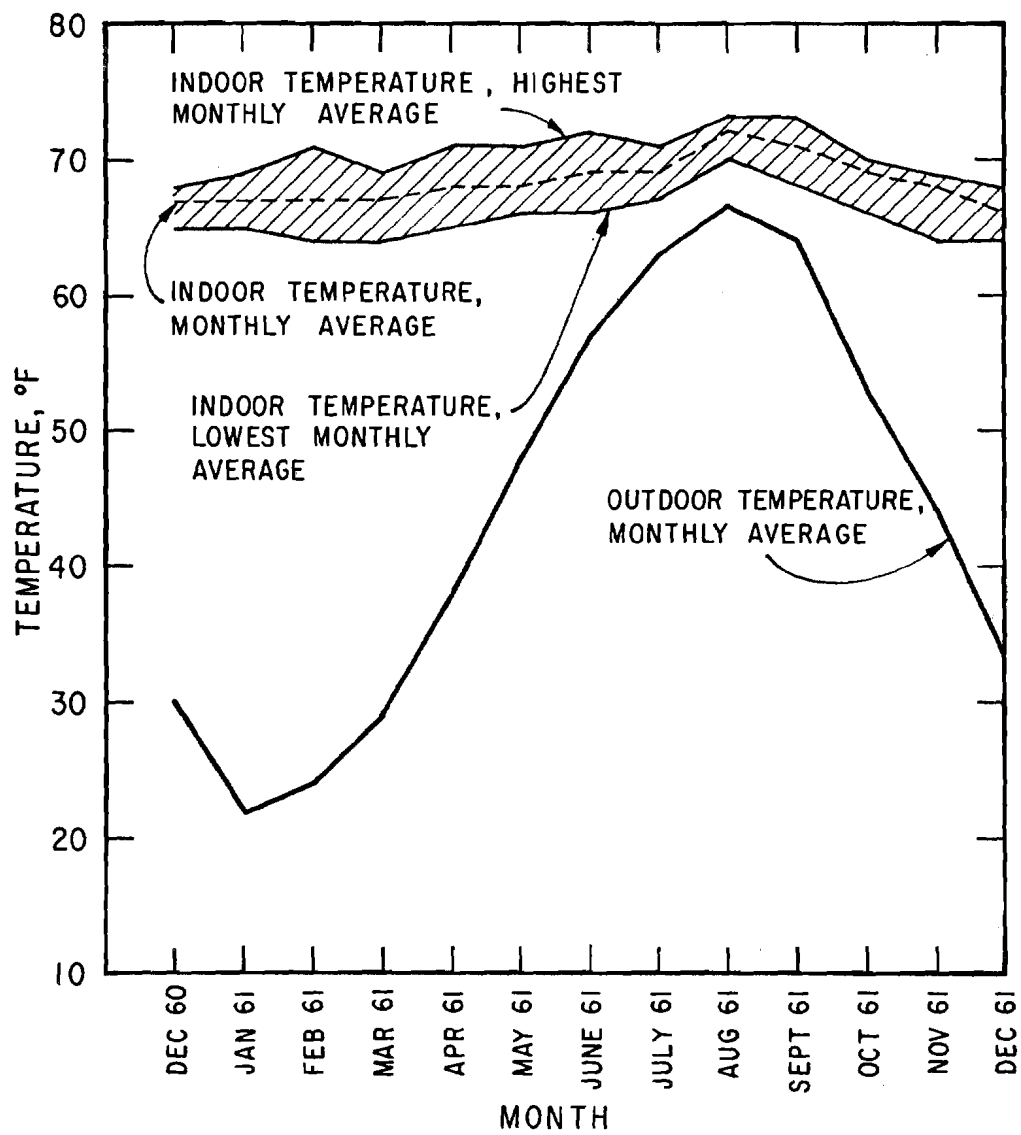


FIGURE 37

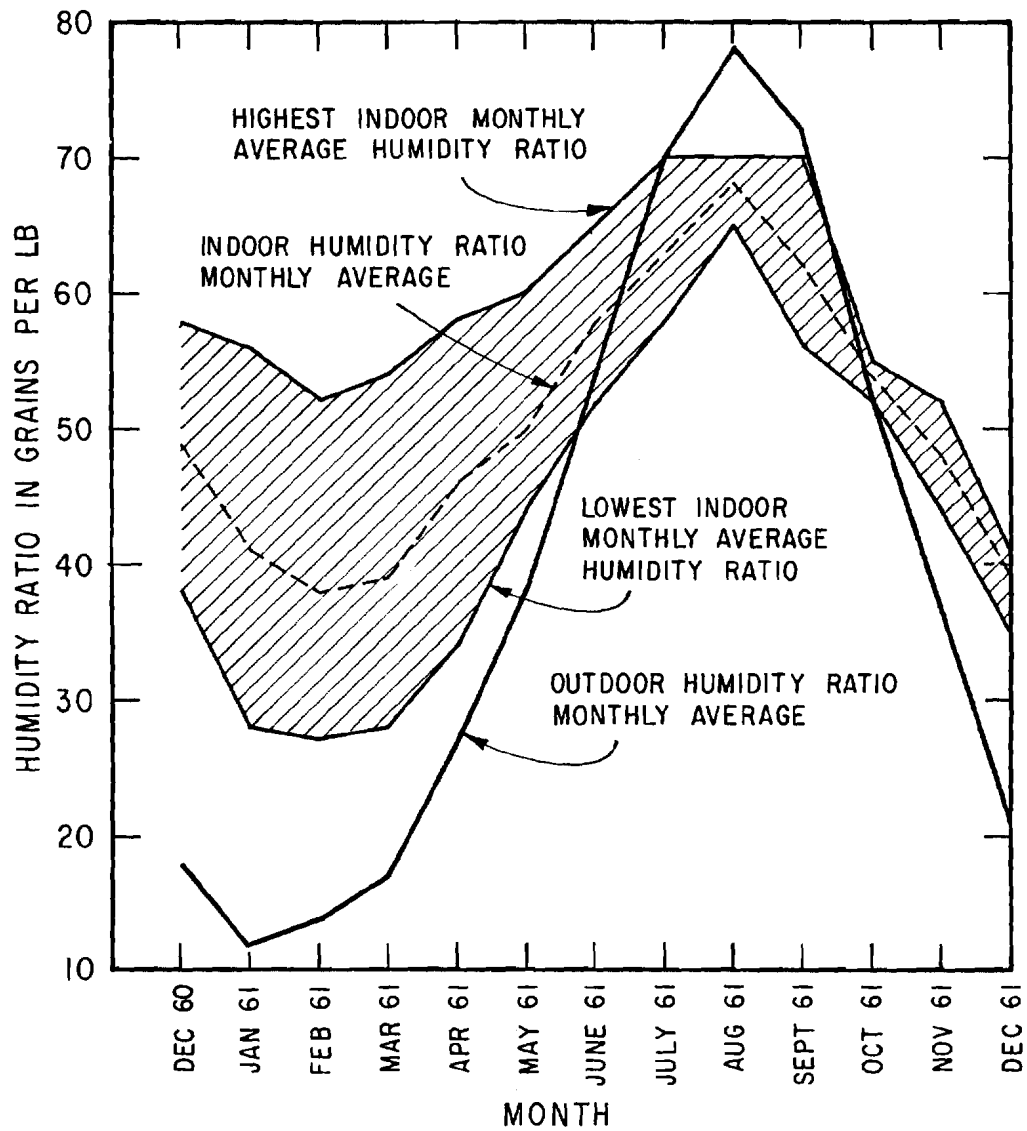


FIGURE 38

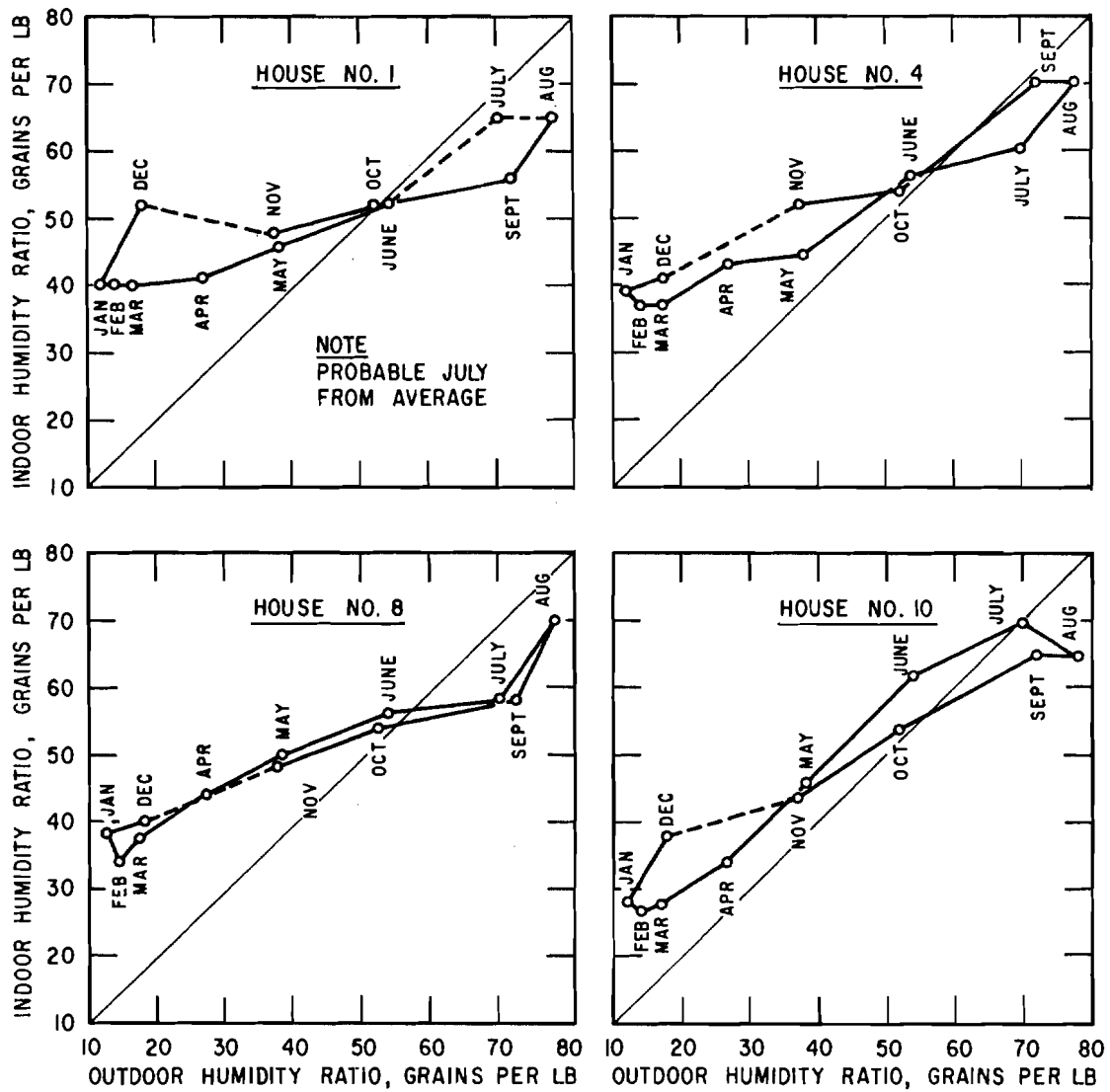


FIGURE 39