Study *Growth* Patterns

Physical Development of Southern Arizona Girls Checked During Tests

By Ethel M. Thompson

The rate at which we "burn up" the food we eat to keep us warm, provide us with energy and permit us to grow, is surprisingly of special interest to those of us living in the southwest. This rate to which I refer is the minimum which exists when we are at complete rest with no voluntary activity. Evidence is now accumulating which leads us to believe that this rate, known as basal metabolism, is considerably lower in warm climates than in cold.

Standards by which to compare metabolic rate of an individual have been established using healthy people living in the northern and eastern parts of this country. When used in southern sections of California, Florida, and Arizona, these standards have all proved, in varying degree, to be too high. It is therefore of clinical and scientific interest that this rate be determined in control groups living in this region, thus establishing a reliable standard.

In the nutrition laboratory of the School of Home Economics we have determined the basal metabolism of a large group of Tucson high school and college girls between 12 and 23 years of age. In adolescence at 12 and 13 years of age, the basal metabolism was found to increase to a peak at about the same level as in girls of the same age living in the north. But, as the girls approached 18 years of age, it dropped sharply to a low level. This diminishing rate was shown to have a statistically highly significant negative correlation with age.

Between 18 and 23 years of age, basal metabolism was maintained at a constant level; there being no significant differences between the years. When the 18-year-old level was compared with that of the same age of similar subjects in several other states located throughout the middle west, a diminishing trend in rate was observed with increasing mean annual temperature.

It is unfortunate but true that in adulthood when basal rate diminishes and appetite and activity remain the same, weight increases. It is important therefore to recognize that after adulthood is reached, especially in women, any increase in weight may be regarded as one warning that basal rate is lower than is to be desired.

Of special interest during the younger adolescent years is the marked increase in metabolic rate — hence in growth — which occurs at this age. Today we have the new device of Wetzel which measures increase in body size by use of the two body measurements, height and weight. Increase in body size during growth is conveniently expressed in terms of so-called "developmental levels" which are identified by increasing numbers from birth to attainment of full growth.

In midwestern states, of several hundred children studied by Wetzel, 67% were 12.0 years of age or less by the time they had reached the developmental level or "d.l." of 105, and 13.0 years of age or less when they reached the d.l. of 118. Of this 67%, 2% were only 8.8 years of age or less at a d.l. of 105 and 10.1 years of age or less at a d.l. of 118; 82% of the entire group were 13.2 years of age or less at a d.l. of 105 and 14.1 years of age or less at a d.l. of 118; 98% were 14.6 years of age or less at a d.l. of 105 and 15.5 years of age or less at a d.l. of 118. It was established in this control group that as long as the child continued to be healthy, he followed the age schedule of growth with which

5. A_4-A_2-A_1-M-B_1-B_2 Types of physique with same developmental level and about the same basal metabolism. All types of physique may be represented in a group having the same developmental level and basal metabolism.

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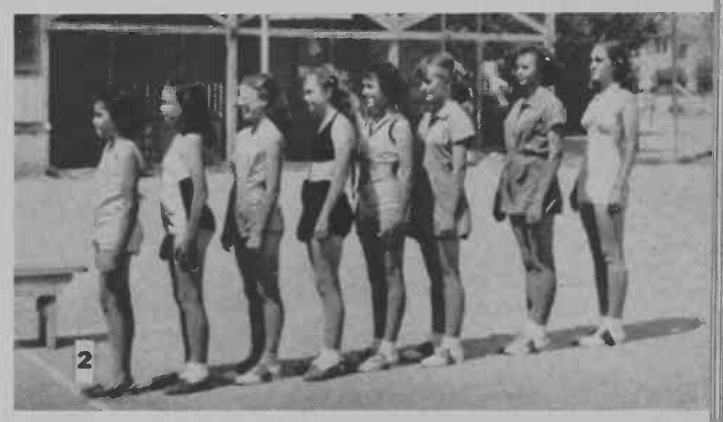
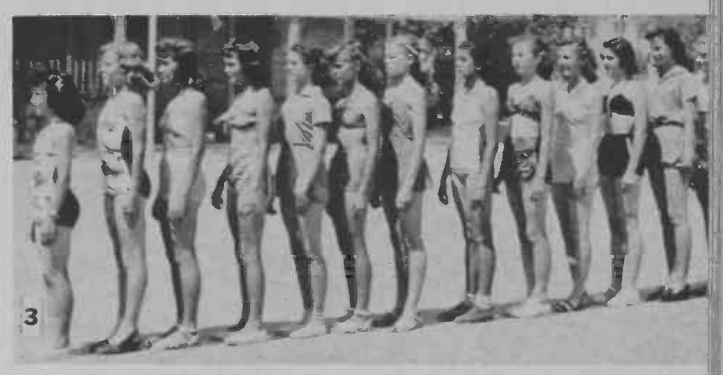
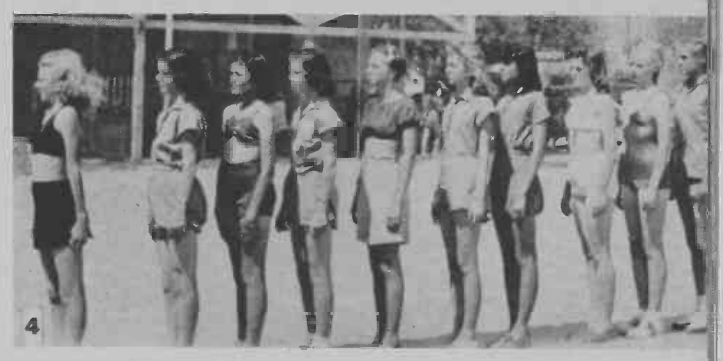
1. A_4 Type of physique with increasing developmental level. This group is obese and stocky.



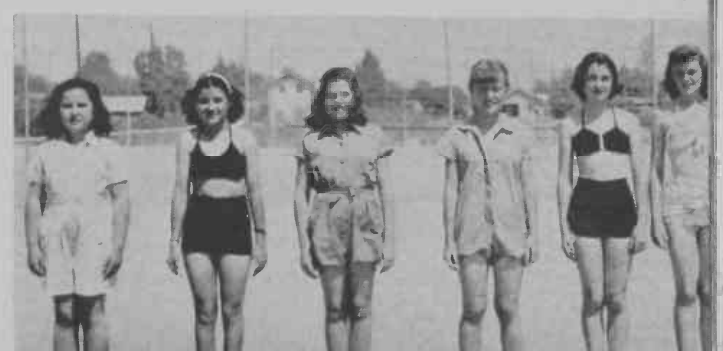
2. M Type of physique with increasing developmental level. "Miss Americas" fall into M-B_1 types. M-B_1-B_2 are the types most representative of the Arizona girls.



3. B_1 Type of physique with increasing developmental level. Professional models fall in B_1-B_2 types because clothes hang better on a thin frame.



4. B_2 Type of physique with increasing developmental level. This is the thin group which should be closely watched.



Frost Protection For Arizona?

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Fifth, the duration of low temperatures is less at 50 feet than at 5 feet. On January 3-4 there were 11 hours below 26° at 5 feet and 3½ hours at 50 feet. On the next night a greater difference existed with 13 hours and 1 hour respectively.

These studies indicate that temperature inversion in the Salt River Valley is sufficient to provide favorable conditions for the use of frost-protection devises. Inversion appears to be similar to that which occurs in many areas in California where orchard heating is practiced. From the meteorological viewpoint, heating can be accomplished here. The economic aspects of heating, however, involve many other factors which should be carefully considered by the growers.

—Robert H. Hilgeman is Associate Horticulturist.

They Learn to Teach Arizona's Farmers

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education of a successful teacher of agriculture. The findings of research in agriculture and the development of new practices in teaching require continuous study on the part of the progressive teacher.

To teachers on the job, the College of Agriculture offers the following services: assistance through individual and group conferences conducted throughout the state, bulletins and other teaching aids for teachers and their students, and special summer-school short courses to meet the specific needs of Arizona teachers.

The graduate short courses are arranged to enable teachers to pursue a continuous program of advanced study even though their work is a year-around job. In recent years, a total of nineteen different short courses have been offered by various dements in the College. Each summer about half of the teachers in the state enroll for these courses.

—R. W. Cline is head of the Department of Agriculture and Home Economics Education.

Extension Service Teaches in Field

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islation establishing research divisions in the Land Grant Colleges, known as Experiment Stations.

Although the first incentive for research in agriculture in these institutions was for student use, it soon became evident that results of agricultural research would be of great value to farmers if the information could be applied. In this movement to reach farm people there developed a plan in the field of education known as farmers' institutes.

A system of printing and mailiing bulletins to farmers was also set up, but both of these efforts were unsuccessful in that neither contained a process to bring about the application of this research information to the farm. Farmers attended the institutes and read the bulletins, but a link in the educational process was missing. People learn by seeing - by doing. Someone conceived the idea of the demonstration method, in some respects resembling the methods used in teaching the natural sciences.

The idea also included a provision for the demonstration system to be operated by a teaching division of the Land Grant College consisting of teachers living with the farm people — knowing them and their problems. So, there came into being in 1914 under the Smith Lever Act the Agricultural Extension Service, a third division of each of the forty-eight Land Grant Colleges.

Without local volunteer leaders the Extension Service could not function as it does. In fact, Extension's widespread unpaid local leaders and cooperators are a unique contribution to this field of education.

The Extension system has been tested and revised through two world wars and the peace following these wars. It has adjusted its programs to periods of boom and depression. Today it touches a high percentage of the homes and farms in rural Arizona.

The work of the Extension Service can be expected to change to meet the new problems of homemaking and of agricultural production, involving new crops, new insects, new diseases, and probably new weeds.

The chief objective of the entire Extension Staff is that the County Agent's office will continue to help local farm people to meet their problems of agriculture.

—Chas. U. Pickrell is Director of the Agricultural Extension Service.

Growth Patterns Are Studied

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he became identified. Any deviation even for a month or two was cause of examination.

A group of 61 girls, 12 and 13 years of age living in southern Arizona most of their lives but living at the time in one school district in Tucson, was studied last year by Mrs. Elizabeth B. Hurley, graduate student. Instead of the above rate of advance she found 23% of her cases following the 2% age schedule (as shown on page 5), 84% following the 67% schedule, and 100% the 82% schedule. None was in the 98% or retarded schedule.

These girls were classified also into 9 general body types of physique referred to, respectively, as A_4-A_3-A_2-A_1-M-B_1-B_2-B_3-B_4; A_4 representing the very fat, B_4 the very thin, and M the average type. (See photos, page 5). Of the Tucson group, fewer cases were classified as being types A_4 to A_2 than those of the midwestern group with more being B_1 to B_3. With this trend to the slender type, together with advanced age schedules of growth, more of the girls are expected to reach the taller statures at adulthood if they continue to conform to the age schedules of the northern girls. However the Arizona schedules may be somewhat modified by the fact that in post-adolescence, of the two groups, the Arizona girls show the greater drop in metabolic rate. It is of interest also that 82% of these 12- and 13-year-old girls had made, at the time of the study, 90% or more of their predicted full growth.

Continued observation of the girls studied by Mrs. Hurley to cessation of growth will give us the full picture. We should know then to what extent this marked acceleration in growth in preadolescence is characteristic of postadolescence resulting in the higher statures of adulthood.

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