Other species of *Pinctada* and *Pteria*, as well as of *Placuna, Malleus*, and *Pinna*, vary widely in their suitability, and in the quantity of porphyrin and nonporphyrin pigment present. The common pearl oyster (*Pinctada margaritifera*) is unsuitable. Of American species, *Pteria radiata* Lam. is a relatively good source, and smaller amounts can be obtained from many Trochidae and from *Trivia* spp. The only form containing amounts of porphyrin comparable to those in *Pinctada vulgaris* is the relatively unobtainable *Cypraea mappa*, the nature of whose porphyrin has not been established.

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Recent Patterns of Employment and Unemployment

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The adoption of the federal old-age insurance law in 1935, and the passage of state unemployment insurance laws about the same time, created a new and rich source of data on employment and unemployment in this country.

Since 1937, a vast amount of detailed information on the employment and unemployment experience of American workers has been collected as a by-product of the operations of these social insurance programs. The brief span of 12 years since 1937 has been strongly affected by World War II. However, the employment data now reported regularly by every covered firm, and the unemployment information supplied by jobless workers claiming unemployment benefits, have already revealed certain patterns and relationships. This paper will discuss briefly some of the patterns of employment and unemployment observed thus far.

A brief description of the information available may be helpful as a background. (A more detailed description is given in [*2*].) The federal old-age insurance law covers about two-thirds of all employment in this country. The following groups are excluded: government workers, self-employed persons, railroad employees, agricultural workers, persons engaged in domestic service, and employees of nonprofitmaking religious, educational, and charitable organizations. The New York Unemployment Insurance Law, which will be used as an example of the state programs, includes the same industries as the federal act but covers only firms with 4 or more employees, thus excluding workers in small firms with 1, 2, or 3 employees.

All covered employers report quarterly the earnings during each calendar quarter for each individual who was employed at any time during this period. Individual keypunch cards are then prepared for each person and sorted by social security number to give a complete earnings record for each worker. In addition, employers report certain total figures, such as the number of persons employed during the week ending nearest the 15th of each month in the quarter. These reports are coded by industry and geographic area and summarized to provide comprehensive data on employment.

One simple employment pattern revealed by these data is the average number of weeks of work per person in a calendar year. This can be derived as follows: In the state of New York, for the year 1939, the number of persons working in the midweek of each of the 12 months was obtained by calculating the data from the employer reports. The average of these 12 numbers was 3,114,000. Studies of weekly employment figures of individual firms for all 52 weeks of the year have shown that the average of the 12 mid-week-of-the-month figures closely approximates the average weekly employment for the year. Thus, the average weekly covered employment in the state in 1939 may be estimated at 3,114,000.

The total man-weeks of work during 1939 can be derived as $52 \times 3{,}114{,}000$, or about 162 million man-weeks. A count of the number of different workers with one or more quarterly wage cards showed that 4,450,000 different persons had worked in covered employment during 1939. There were 162 million man-weeks spread among 4,450,000 persons, or an average of 36.4 weeks of work per person.

In New York State, during the 10 years from 1939 to 1948, average employment rose from 3,114,000 in 1939 to 4,366,000 in 1948, and the number of individual workers during a calendar year rose from 4,450,000 in 1939 to 6,350,000 in 1948. Yet the average number of weeks of work per person showed little variation.

During the 3 prewar years, 1939–41, the range was from 36.0 to 36.4. During the 4 wartime years, 1942–45, the average number of weeks worked per person ranged from 34.2 to 34.6. The 3 postwar years, 1946–48, showed a range from 35.5 to 35.8. For the entire 10-year period, the range was from 34.2 weeks in 1942 to 36.4 weeks in 1939. The relative stability of this average is noteworthy in view of the dynamic changes in employment resulting from World War II and the sharp rise in both the level of employment and the number of persons in the labor market.

A similar analysis applied to data on employment covered by the old-age insurance law recently published by the federal Bureau of Old-Age and Survivors Insurance (*4*) showed 36.1 weeks of work per person in 1947 and 37.2 weeks in 1948.

A second type of analysis uses the employment data arising out of the long-range, continuous-work-history

study that has been carried on since 1937 by the federal Bureau of Old-Age and Survivors Insurance. A similar long-range study, which includes both employment and unemployment experience, has been undertaken in New York State using the records of the Division of Placement and Unemployment Insurance. It should be noted that, before the social insurance programs began in 1937, it was difficult and expensive to collect any data on individual employment experience over a period of many years. (One study, covering the experience of several thousand boys and girls from 1921 to 1939, has been made by Thorndike and Lorge [*1, 3*]).

The old-age insurance study at present covers a 1% random sample of all persons who have received social security account numbers since 1937. This is done by selecting certain end digits of the 9-digit social security numbers. At the end of 1945, this sample totaled about 750,000 persons. It is planned to expand the sample at some later time to include about 2.5% of the covered workers. The New York sample is the approximately 10% group of persons who have 2 as the sixth digit of their social security numbers. The two studies purposely overlap, so that the New York data on unemployment and the old-age insurance data on employment in small firms with fewer than 4 workers can be combined to give a more complete picture. For each person the available data from 1937 on show age, sex, industry of each employer, calendar quarters and years of work, quarterly and annual earnings, and the geographic area of employment. The unemployment data available for the New York group show the number of weeks of unemployment each year as represented by claims for unemployment insurance.

Detailed tabulations of the old-age insurance materials are published annually in the *Handbook of Old-Age and Survivors Insurance Statistics*. The following figures are derived from the 1945 *Handbook*.

The 1% continuous-work-history sample covering the 9 years from 1937 through 1945 includes 755,000 persons who, in one or more years during this period, were employed in covered industries. Almost one-fifth of these persons had been employed in all 9 years. There were 468,000 men in the sample, or 62%; 24% of these men had been employed in all 9 years. Of the 287,000 women in the group, only 10.6% had employment in all 9 years.

Another view of the 9-year pattern of employment can be obtained by considering the 329,500 persons in the sample who had employment in 1937, the first year of the old-age insurance program. Of these 329,500 persons who were working in 1937, 143,000 or 43.4%, have worked in each of the 9 years from 1937 through 1945. Again the men showed a greater stability of employment, with 47% of the 1937 workers having some employment in each of the 9 years, as against 34% for the women.

The 1945 *Handbook* also contains data on the distribution of the workers in the 1% sample into groups having continuous patterns of 1–9 years of employment, and those having intermittent patterns of 2–8 years of employment. Some of the other tables give the following information:

1. The number of persons beginning their employment history in each year.

2. The number of persons having their latest employment in each year.

3. A cross-tabulation of the workers showing the number of years, and the latest year, of employment.

4. A cross-tabulation of the workers by number of calendar quarters of employment from 1937 to 1945, and the number of years of employment.

Similar data are given in the recently published 1946 *Handbook*, which covers the 10-year period from 1937 to 1946. One interesting 10-year result may be mentioned: In 1937, there were 33 million persons in this country employed in firms covered by the old-age insurance law; 40% of these worked in covered employment in all the 10 years from 1937 to 1946.

In New York State sample studies have shown that, in 1943 (using this wartime year of high-level employment as an illustration), 72% of the workers had one employer during the year; 15% had two employers; and 13% had three or more employers. In the same year, 78% of the workers were employed in one industry; 15% had employment in two industries; and 7% worked in three or more industries. The industry code used has about 60 different classifications.

The unemployment data in New York have revealed an invariant relationship in the duration of unemployment in every year. Unemployment benefits in New York are payable for a maximum of 26 weeks in the 12-month "benefit year," which begins in June. The distribution of persons by the number of weeks of benefits shows remarkable regularity for each year. The ratio between the cumulative number of persons who have received at least x weekly checks and the group of persons who have received at least $x+1$ weekly checks is a constant for all pertinent values of x. In other words, the probability of persons with x weeks of unemployment reaching at least $x+1$ weeks is a constant for x ranging in value from 1 to 25. For example, in the 1946–47 benefit year, this constant probability was .94, with the smallest ratio, .933, occurring when x was taken as 1, and the largest ratio, .945, occurring when x was taken as 15 weeks.

In all the 9 benefit years from 1940–41 through 1948–49, this invariant relationship was found. In 6 of these years the constant probability was approximately .94. In 1942–43 the constant was .92. In 1943–44 and in 1944–45 it was .91. In considering the extremely small variation in this ratio within each year and the minor change from .94 to .91 during the height of wartime activity, it should be noted that the period from 1940 to 1949 varied from considerable compensable unemployment in 1940–41, when 830,000 persons received benefits, to very little unemployment in 1944–45, when only 76,000 persons received benefits. It then rose again in the postwar period, with approximately 900,000 persons receiving benefits in 1948–49. This constant ratio existed in spite of the wide variations in economic conditions.

Another feature is the incidence of recurrent beneficiaries, persons who receive unemployment insurance

benefits in two or more successive years. For example, about 900,000 persons received one or more checks during the first year of the program in New York, in 1938. Of this group, 44% also received benefits in the second year; 24% received benefits in the third year; and 12% received benefits for four successive years. The tendency for about half the beneficiaries in any one year to receive unemployment benefits also in the following year has been observed throughout the period from 1938 to 1949.

Some other patterns may be mentioned: From the data on unemployment, it is possible to obtain the distribution of the persons claiming benefits by the number of periods of unemployment in each year. Taking the year 1939 as an example, there were over 900,000 persons who filed claims for benefits. About 55% of these persons had only one period of unemployment during this year, 25% had two, 10% had three, and 10% had four or more.

Intensive analysis of the information being produced as by-products of the social insurance programs and additional studies starting from the clues provided by these data will be necessary to test the stability of the patterns that are being revealed, as well as to discover the significant relationships that may be hidden in the data available thus far. Such studies may lead to the development of a comprehensive theory to coordinate and explain the observed regularities.

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Comments and Communications

On the Persistence of 2,4-D in Plant Tissue

In a recent issue of SCIENCE, Tullis and Davis (1950, **111**, 90) have interestingly reported characteristic symptoms of 2,4-D injury during the season of 1949 on developing shoots of Chinese tallow trees (*Stillingia sebifera* Michx.) that had been subjected to 2,4-D in 1948 but not in 1949. Further, they observed no injury during the season of 1949 on chinaberry trees (*Melia Azedarach* L.) that had been severely injured in 1948 by 2,4-D. They have interpreted these results to indicate the persistence of 2,4-D in tissues of the Chinese tallow tree from one growing season to the next, and the lack of persistence in the tissues of the chinaberry tree under similar conditions. The facts are of special interest because they contribute to an understanding of the mode of action of 2,4-D.

The appearance of 2,4-D injury in perennial plants the season following treatment is, however, not uncommon. Many instances are on record of orchards and vineyards treated during one season with formulations of 2,4-D for weed control or for the prevention of premature abscission of fruit, which developed anomalous leaves, flowers, and fruits the following season (Bryant, L. R., Vincent, C. L., and Schafer, E. G. [*Proc. Amer. Soc. Hort. Sci.*, 1947, **49**, 63]; Harley, C. P., Moon, H. H., and Regeimbal, L. O. [*Proc. Amer. Soc. Hort. Sci.*, 1947, **50**, 38]; Marsh, R. S., and Taylor, C. F. [*Proc. Amer. Soc. Hort. Sci.*, 1947, **49**, 59]; Moon, H. H., Regeimbal, L. O., and Harley, D. P. [*Proc. Amer. Soc. Hort. Sci.*, 1948, **48**, 81]; and Teske, A. H., and Overholser, E. L. [*Virginia Fruit*, 1947, **35**, 15]). The responses are variously described as delayed foliation, malformed and stunted leaves, fruits with oblong shape and open core, double fruits, and fruits with only rudimentary seeds.

Also, an experience has been reported by Tukey and Hamner (*Proc. Amer. Soc. Hort. Sci.*, 1949, **49**, 95) in a mixed planting of sweet and sour cherry trees (*Prunus avium* L. and *P. cerasus* L.), which was sprayed the fall of 1946 with a mixture of naphthalene acetic acid and 2,4-D. The following season many leaves were dwarfish, narrow, and sharply serrate; both pits and fruits were markedly elongate and pointed; receptacles were much enlarged; strong vascular development occurred in both fruit and pedicel; flesh was strongly adherent to the pit; and chemical composition of the fruit was altered. However, repeated applications of various growth regulators to cherry trees by Tukey (unpublished data) in the spring and midsummer produced no such visible effects the following season.

The facts suggest that there are critical or sensitive periods in the growth of the cherry, and that applications of growth regulators made in the fall may produce a striking effect upon carpel development, which may in turn be reflected in the developing fruit the following season. Applications made at other times may, however, fail to produce a response, because critical parts may be already formed, not yet formed, or in a state of physiological insensitivity or inactivity.

Studies by D. P. Watson (*Amer. J. Bot.*, 1948, **35**, 543) on modification of bean leaves as a result of treatment with 2,4-D bear on this point. They show delayed expression of the effect of growth regulators, associated with the stage of development of a leaf at the time the treatment is made. Watson concludes: "Frequently, plants that exhibit what appears to be delayed injury have received leaf injury during the formation of buds which did not expand until some time later."

Similarly, Arthur J. Eames (*Amer. J. Bot.*, 1949, **36**, 571), working with nut grass (*Cyperus rotundus* L.)