THE STATUS AND REMUNERATION OF THE PROFESSIONAL MAN IN INDUSTRY

(3 PARTS)

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OF

SOCIAL ORGANISATION LIMITED

60 DRAYTON GARDENS,

LONDON, N. 21.

Reprinted from July, October & November 1961 issues

BRITISH CHEMICAL ENGINEERING

COMPLETED 29th SEPTEMBER, 1960

PART I

THE STATUS AND REMUNERATION OF THE PROFESSIONAL MAN IN INDUSTRY

It is shown that professional employees receive remuneration according to definite remuneration laws and according to National Remuneration Scales. Remuneration of engineers, chemists and manual employees is analysed and compared. Status (a measure of "differential") and other measures are defined to enable professional individuals and groups to be compared with other individuals and groups. The chemist is better off than the engineer and the more successful professional employee is losing ground when compared with his less successful colleagues.

by M. DAVIDMANN

Introduction

THE Royal Institute of Chemistry surveyed the earnings of its corporate members in 1953,[1] 1956[2] and in 1959.[4] A survey of the earnings of members of the Institutions of Civil, Mechanical and Electrical Engineers was carried out, for the income tax year 1955/56, by the Social Survey Division of the Central Office of Information.[5, 8] The two surveys were compared,[7] it being concluded that chemists during 1956 earned appreciably more than the engineers concerned, and that the earnings of chemists advanced markedly between 1956 and 1959. A list of starting salaries for chemical engineers has been published.[6] Income surveys have also been carried out in the United States.[12, 13, 14]

Chemical engineers are included in the Engineers' Guild latest survey, the results of which should be available by January, 1961. As regards engineers, some idea of relative numbers is given by the total membership figures,[3] both corporate and non-corporate, of the professional institutions for 1959:

Institution of Civil Engineers	24,100
Institution of Mechanical Engineers ...	50,100
Institution of Electrical Engineers ...	44,500
Institution of Chemical Engineers ...	4,300

Surveys such as those carried out in the United Kingdom, based on membership of a professional institution, do not include those employees who do equivalent work but do not have professional qualifications in terms of corporate membership of an appropriate institution. Such employees are common in engineering, but non-existent in medicine. In addition, not every professionally qualified person practises the profession in which he originally qualified.

The remuneration of a professional employee increases with age, up to a point. But a salary is paid not in accordance with age-group, but according to the work done. This is the common factor which links the professions amongst themselves and to other members of the society, such as, for example, manual employees.

Remuneration surveys are examined here and interpreted so that individuals, grades within the professions and groups of people who receive remuneration for doing the same type of work can be compared. Individuals may compare their own progress as regards remuneration and status with that of others within their own grade or group. Changes in status between individuals in different grades or groups may similarly be evaluated. For example, the status of the professional employee is changing relative to that of the manual employee and this change is evaluated in the article. Groups may be compared with each other, for example, one profession with another or with a group of manual employees.

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Remuneration Surveys

The data in these surveys is obtained from questionnaires duly completed by a considerable percentage of the members of the group. The sample size is chosen so that the survey is representative. The sample is divided according to age groups and for each age group the data consists of an income distribution. The corresponding cumulative frequency distribution can be drawn, so that for any given cumulative frequency we have the corresponding income. The cumulative frequency is termed the "fraction"; the corresponding income is termed the "quantile". The quantile gives the limiting income for its fraction. In other words, this fraction of the sample, for the particular age group being considered, has an income which equals, or is less than, its quantile. The quantiles commonly used in remuneration surveys are the deciles, octiles, quartiles and the median, as follows:

Fraction %	*Quantile*
10, 20, ... 90	deciles
$12\frac{1}{2}$, $37\frac{1}{2}$, $62\frac{1}{2}$, $87\frac{1}{2}$	octiles
25, 75	quartiles
50	median

Quantiles corresponding to particular fractions are determined for each age group, tabulated and illustrated by graphs of income plotted against age. These graphs illustrate the income distribution for the sample, and thus for the whole group which the sample represents.

Income distributions differ markedly between professions. Hence they have been compared[8] by means of "career earnings" from age 30 to age 65. Career earnings represent the earnings of a man in a particular profession, aged 30 at the time of the survey, between the ages 30 and 65, working full-time, all circumstances remaining unchanged

from the year of the survey. Average incomes were used in compiling career earnings and attention was drawn[8] to a possible disadvantage of this method: "The average does not indicate whether the earnings of most members of the profession are close to that amount, or whether a few earn a great deal more and a good many much less."

Here we analyse further the data available for professional chemists[1, 2, 4] and for professional civil, mechanical and electrical engineers[5, 8] as a group.

Analysis of Remuneration Surveys

The income earned in any particular year by a given fraction of the population correlates as a function of age, as follows:

$$Y_r = y_{0r}e^{-(X_r - x_{0r})^2/b} \quad \ldots . (1)$$

where Y = income, usually the gross earned income (£ p.a.);
X = age;
x_0 = age at which Y is a maximum;
y_0 = maximum value of Y, at $X = x_0$;
b = constant;
r = suffix, indicates that the levels are those pertaining to the year "r" to which the survey refers.

When G represents the fraction, in per cent, then the income distribution for the group as a whole, or for any part of it, is completely defined by

(a) the level of the constant b;
(b) the relation between x_{0r} and G;
(c) the relation between y_{0r} and G.

The income distribution of chemists and engineers has been analysed accordingly. The results of the calculations are given in Table I.

The data in Table I are illustrated by Figs. 1-4. Figs. 1 and 2 illustrate the x_{0r} and y_{0r} distributions for chemists, Figs. 3 and 4 those for engineers. It is seen that the chemists' x_{0r} distribution has not changed appreciably between 1953 and 1959, and neither has the level of b. Taking values of x_{0r} and y_{0r} from Table I, but values for x_{0r} for chemists from the single curve in Fig. 1, and taking $b = 1985$ for engineers and $b = 1265$ for chemists (see Table I), we can then compare the original data with the derived equations. The comparison is illustrated by Figs. 5-8, and reasonable correlation is obtained.

TABLE I.—Analysis of Remuneration Surveys for Engineers and Chemists

Fraction	Age at which Income is a Maximum	Maximum Income
G	x_{0r}	y_{0r}
%	years	£ p.a.
Chemists—1953		
50	57.3	1483
Chemists—1956		
25	53.4	1366
50	57.0	1811
75	61.2	2574
Chemists—1959		
12½	51.9	1418
25	53.5	1627
37½	55.7	1877
50	57.0	2126
62½	58.5	2441
75	60.7	2933
87½	65.6	4178
Engineers—1955/56		
25	56.9	1187
50	62.8	1615
75	72.1	2626
90	79.6	4453

Note: b is 1985 for engineers and 1265 for chemists.

Symbols Used

b = constant, defining the distribution of remuneration with age, for a particular group or subgroup;
i = rate of change, per cent compound rate of change per year, generally expressed as a fraction;
x_0 = age at which remuneration is a maximum, for a particular grade;
y_0 = maximum level of remuneration, at age x_0;
C = career or mean career earnings (£);
E = remuneration received by manual employee during one year, preferably the fiscal year (£);
G = fraction (per cent) = grade. For example, $G75$ = grade 75 per cent when fraction = 75 per cent.
I = index, preferably used on the basis that $I = 1$ in the reference year.
S = status, that is remuneration ratio;
S_{12} = status, ratio of remuneration of subject "1" to subject "2", with S_{12} preferably ≥ 1.
T = time, that is year, for example: 1960. Either fiscal or calendar year, preferably fiscal year;
X = age (years);
Y = remuneration received by professional employee during one year, preferably the fiscal year (£).

Suffixes

g = grade;
m = manual employee;
n = any particular year;
p = professional employee;
r = reference year, for example year to which survey refers or in which a particular index is 1;
s = status;
R = reference year of economic index;
X = at constant age.

Further, from Equation (1), it is seen that:

$$Y_r/y_{0r} = e^{-(X_r - x_{0r})^2/b} \quad \ldots . (4)$$

The constant b thus defines the income distribution, for any particular group, and this can be illustrated by a graph of Y_r/y_{0r} versus $(X_r - x_{0r})$. All the data can be plotted and compared with the income distribution as calculated by Equation (4). Figs. 9 and 10 illustrate the degree to which the estimated constants correlate the data, for chemists and engineers, respectively, x_{0r} and y_{0r} having been determined from Table I and Fig. 1, as before.

The National Remuneration Scale

The constant b and the x_{0r} and y_{0r} distributions having been determined, we may now draw up the National Remuneration Scale for each profession.

The national scales for chemists and engineers are given in Figs. 11 and 12 for the years 1959 and the Income Tax year 1955/56 respectively. The scale consists of the decile earnings. The scales are static, applying to a particular year. The evidence on the chemists' income distribution shows that one may expect such scales to alter with time only as regards the y_{0r} distribution. The chemists' income distribution remained virtually constant over six years, apart from the y_{0r} distribution. It may reasonably be assumed that this applies generally, although there are known exceptions.

The national remuneration scales given here were calculated from the x_{0r} and y_{0r} distributions, the constant b having been determined already. They could have been determined from the cumulative income distribution for each of the age groups, the distribution constant b and the x_{0r} and y_{0r} distributions being also determined from the decile

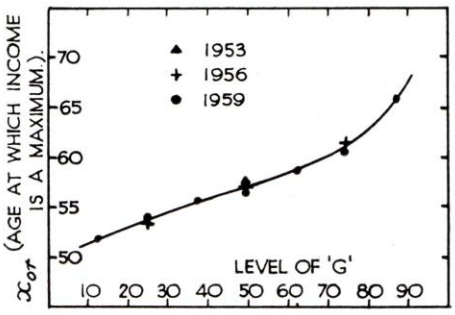

Fig. 1. *Distribution of age at which income is a maximum for chemists.*

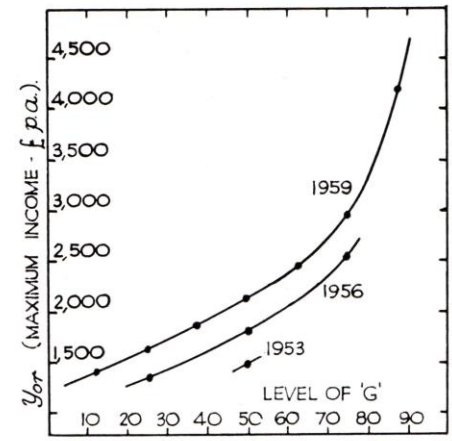

Fig. 2. *Distribution of maximum income for chemists.*

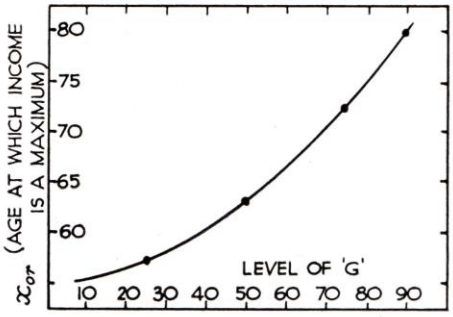

Fig. 3. *Distribution of age at which income is a maximum for engineers* (1955/56).

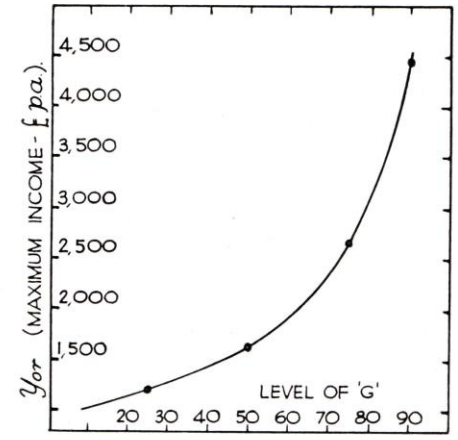

Fig. 4. *Distribution of maximum income for engineers* (1955/56).

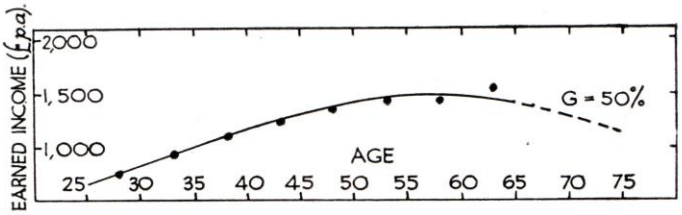

Fig. 5. *Remuneration of professional chemists* (1953).

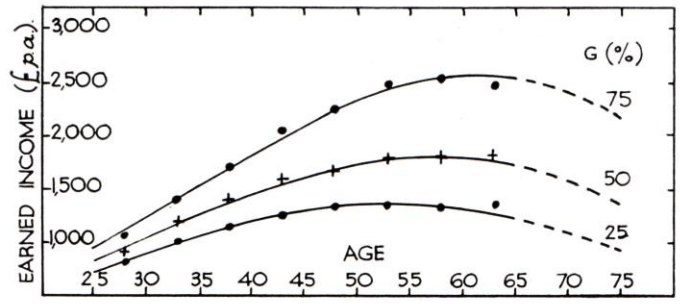

Fig. 6. *Remuneration of professional chemists* (1956).

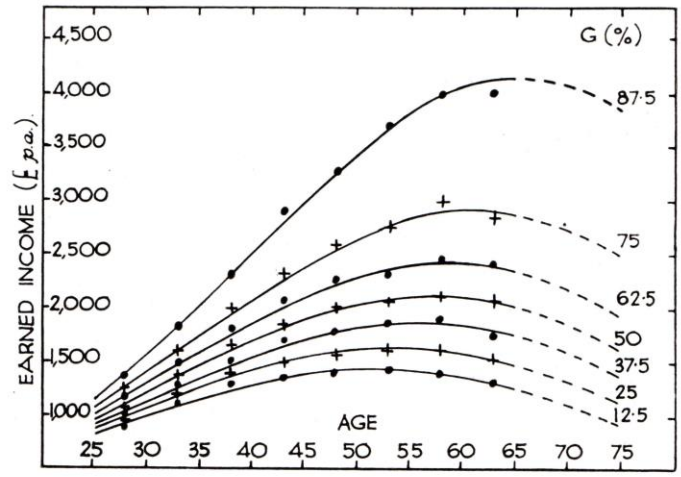

Fig. 7. *Remuneration of professional chemists* (1959).

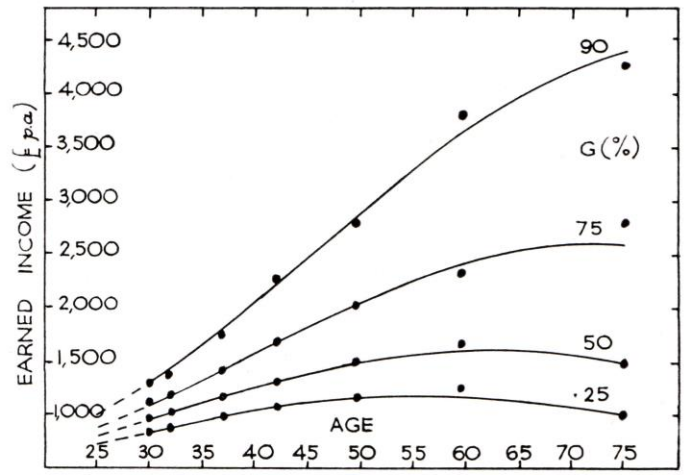

Fig. 8. *Remuneration of professional engineers* (1955/56).

income distributions. There is a strong case for future surveys to be recorded in this way.

Criteria of Comparison and the Measurement of Change

By "grade" is meant the position of an individual relative to other individuals within the group. Grade is defined by the "fraction" and, for example, an individual of grade 20, this being denoted by $G = 20$ or $G20$, receives remuneration such that 20 per cent of individuals in his own group receive the same remuneration or less. Individuals of the same grade form a sub-group within the main group, and the term "grade" applies to the individual as well as to the sub-group.

For the Individual

An individual, on entering up his age and remuneration in the appropriate scale, for the year to which it applies, may now estimate his grade by estimating G by interpolation.

The individual's grade measures his status within his group and the value of G enables him to compare his progress with that of others. If the value of G rises, his status rises. If G is lowered, his status within his group is lowered.

For the Grade

The measure adopted for comparing different grades, within the same group, is termed the "career earnings", from 30 to 65 years of age. This has already been defined[3] for a group, on the basis of average income per age group. It is here defined as representing what an individual of a particular group may earn if he worked on a full-time basis from age 30 until age 65, should he remain in his grade throughout this period, and should the remuneration scale remain constant in all respects.

Career earnings may be calculated for any particular grade from the national remuneration scale (Figs. 11 and 12). When interpolation is not considered to be sufficiently accurate, the remuneration for any particular grade may be calculated from Equation (1) when the value of b and the x_{0r} and y_{0r} distributions are known.

Career earnings were calculated from the national remuneration scales and Table II lists the results, which are further illustrated by Figs. 13 and 14.

The changing level of y_{0r} is a measure of how grades advance in relation to each other, within a group. Considering the data for chemists (Fig. 13), we see how the relative position of grades, that is, their status, is changing. Fig. 15 illustrates this point, the gross earned income of the lower grades increasing at a faster rate than that of the higher grades. Over an interval of three years, between 1956 and 1959, the gross earned income of the $G25$, $G50$ and $G75$ grades increased by 19 per cent, 17 per cent and 14 per cent respectively. A process of equalization appears to be taking place, the more successful chemists losing ground to their less successful colleagues. To that extent the status of the more successful relative to the less successful chemist is being reduced. It is this status which provides incentive

TABLE II—Career Earnings

Grade	Chemists				Engineers
G (%)	1953	1955 (estimated)	1956	1959	1955/56
10	—	—	—	43,900	—
20	—	38,300	—	49,000	36,100
25	—	40,200	43,200	51,300	—
30	—	42,400	—	54,000	40,000
40	—	46,700	—	59,100	44,000
50	45,100	51,500	55,100	64,500	48,300
60	—	57,400	—	71,000	53,600
70	—	65,000	—	78,900	61,800
75	—	69,700	73,700	83,800	—
80	—	77,800	—	92,500	73,300
90	—	—	—	114,800	92,900

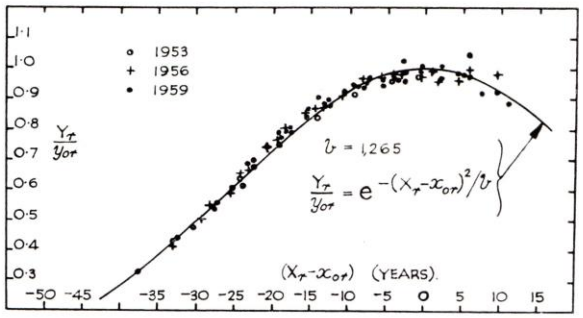

Fig. 9. Income distribution for chemists.

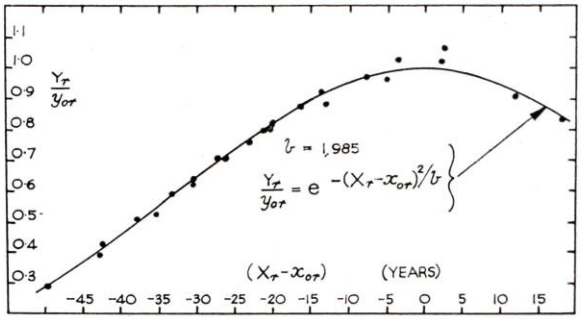

Fig. 10. Income distribution for engineers (1955/56).

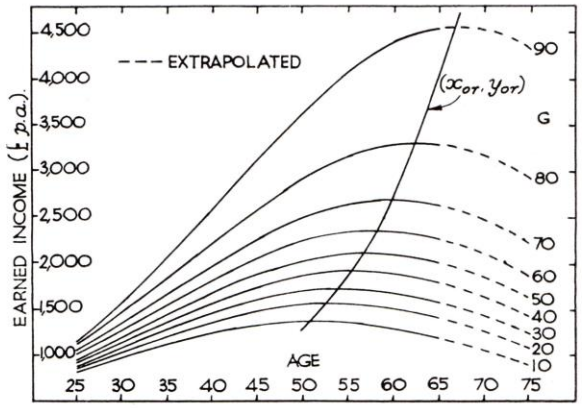

Fig. 11. National remuneration scale for professional chemists (1959).

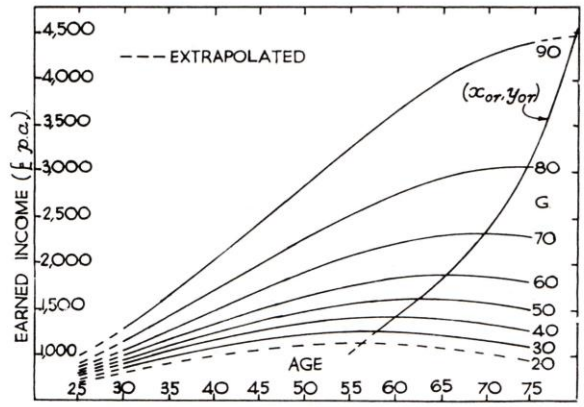

Fig. 12. National remuneration scale for professional engineers (1955/56).

to succeed and it is incentive for producing outstanding work which is being reduced.

Status is relative position, and may be evaluated as a career earnings or mean career earnings ratio, for grades or groups, respectively. For example, the status between the $G75$ and $G25$ chemists was 1.71 in 1956 and 1.63 in 1959.

For the Group

To compare different groups with each other the measure "mean career earnings" is used. This is the mean earned income of the middle 60 per cent of the group, that is, that part of the group which falls between the limiting grades $G20$ and $G80$. It is the mean ordinate of the career earnings distribution (Figs. 13 and 14) between the limits $G20$ and $G80$. It reflects changes in the level of remuneration and differences in incentive to advance to higher grades within one's own group, for the middle section of the group, and thus prevents outstanding success or failure of small sections of the group from affecting the comparison.

Mean career earnings for chemists and engineers are given in Table III.

Table III gives the comparative data on chemists and engineers. It is seen that chemists occupy a position of higher status within the community when compared with engineers. Changes in status, with time, can be assessed, as already illustrated for grades. The status of chemists as compared with engineers was 1.03 in 1955.

Chemists and Engineers

The remuneration of chemists and engineers is compared in Figs. 16-18. Fig. 16 compares the basic earned income distributions; Figs. 17 and 18 compare the x_{0r} and career earning distributions, respectively, grade for grade. It is seen that the earned income of chemists increases more rapidly

TABLE III—Mean Career Earnings

Year	Mean Career Earnings	
	Chemists	Engineers
	(£)	(£)
1955	53,400*	50,400†
1956	56,700	
1959	66,000	

Notes: (1) * Estimated.
(2) † 1955/56.
(3) Limits of G: 20 to 80 per cent.
(4) Limits of X_i: 30 to 65 years of age.

with age than does that of engineers (Fig. 16) and that the chemist reaches his maximum income at an earlier age than the engineer (Fig. 17), grade for grade. This difference is appreciable for the higher grades.

The chemists' career earnings were estimated for the year 1955 on the assumption that the pattern of change between grades (Fig. 15, 1956-1959) would apply to the period 1955-1956, this pattern being superimposed on the overall change. The estimate is given in Table II and is compared with the original data by Fig. 13.

The mean career earnings are given in Table III.

The chemists' 1956 survey is based on salary payable on April 1, 1956. The Engineers' survey analysed income during the fiscal year 1955/56. Hence a direct comparison would have been weighted. Given an increase in salary during the fiscal year, the salary (rate of earning) at the end of the fiscal year would be higher than earnings received during the fiscal year. By estimating the chemists' data for April 1, 1955, from that on April 1, 1956, weighting is reversed. The chemists' income is now likely to be underestimated and this, although reducing the reliability of the calculated ratio between chemists and engineers, supports the conclusion that chemists then had a higher status within the community when compared with engineers.

We may summarize the comparison between chemists and engineers as follows:

(1) We are comparing professional chemists, as a group, with professional civil, mechanical and electrical engineers, as a group, in the fiscal year 1955/56.
(2) The chemist's income increases more quickly with age, grade for grade, than that of the engineer. The chemist reaches his maximum income at an earlier age. On the whole, the chemist's income distribution is the more desirable, as earnings increase with need to a greater extent than that of the engineer.
(3) The chemist's mean career earnings are greater than those of the engineer. They each have the same incentive to advance to a higher grade, grade for grade (Fig. 18). This incentive, for chemists, was reduced during the period 1956 to 1959, no data on this point being available for engineers at the time of writing.
(4) Chemical engineers are not included in this comparison. It should be noted that the earnings of chemical engineers appear to be higher than those of other engineers, when both are employed by chemical plant contractors.

Other Professions and Manual Employees

Extensive data for other professions was published in the Report of the Royal Commission on Doctors' and Dentists' Remuneration.[8] To illustrate further the method, and to extend the comparison, the distribution of career earnings (Table IV, Fig. 19) and the mean career earnings (Table V) were calculated for a few of the professions, by the method given in the Report,[8] but for each grade. It is seen that, compared with the chemist and the engineer, the university teacher earns more, but has somewhat less incentive to advance within his group, particularly at the higher grades. The general medical practitioner and the general dental practitioner earn more than any of the other professions. Over the greater part of the range considered, the incentive to succeed (that is, the reward for success) is greater for the general medical practitioner than for any of the other professions, and greater still for general dental practitioners. Up to grade $G55$ the medical practitioner earns more than the dental practitioner. Beyond this grade, the successful dental practitioner earns more than the successful medical practitioner. The very successful dental practitioner earns much more than the very successful medical practitioner. On the other hand, general medical practitioners form but part of their profession, which includes consultants, who may be regarded[8] generally as the

TABLE IV—Career Earnings (£) of Selected Professions (1955/56)

Profession*	Grade G (%)			
	25	50	75	90
General medical practitioners	58,400	76,800	94,400	110,800
General dental practitioners	54,700	75,500	102,700	137,800
University teachers	49,200	60,500	74,300	88,500

* Each profession is defined in the Report of the Royal Commission.[8]

TABLE V—Mean Career Earnings and Status (1955/56)

Profession	Mean Career Earnings		Status of Professional Relative to Manual Employee
	As given by Royal Commission[8]	As calculated here	
General dental practitioners	79,000	77,200	4.52
General medical practitioners	79,000	76,600	4.48
University teachers	63,000	61,100	3.58
Chemists	—	53,400	3.13
Engineers	59,000	50,400	2.95
Manual employees	—	17,100	1.00

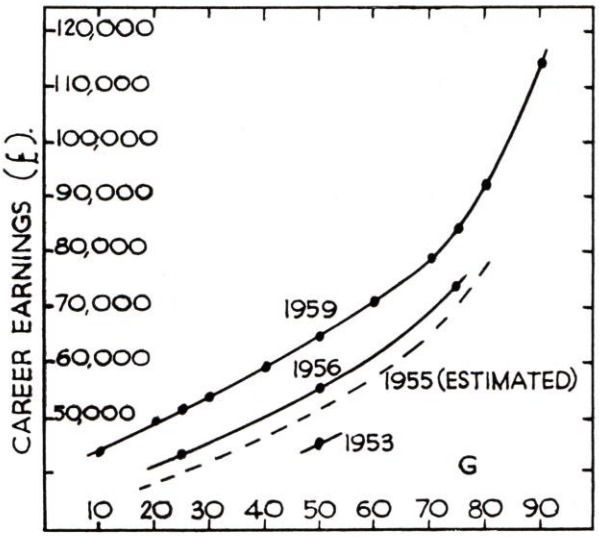

Fig. 13. Distribution of career earnings for chemists.

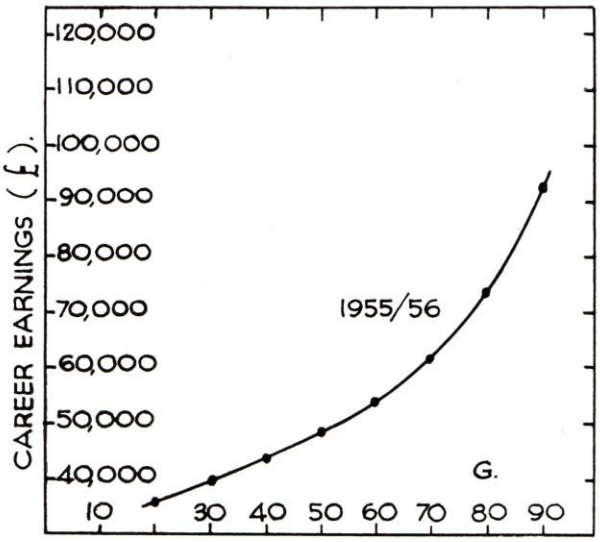

Fig. 14. Distribution of career earnings for engineers.

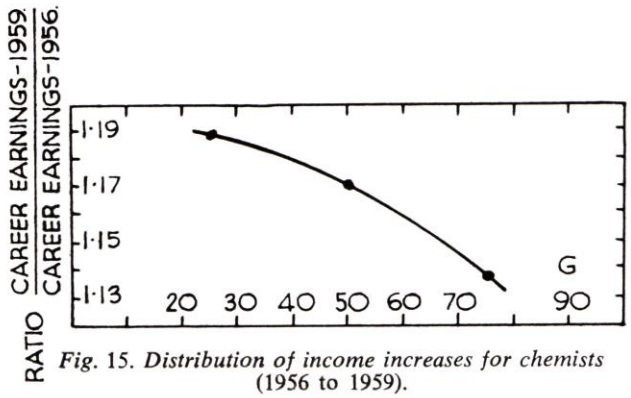

Fig. 15. Distribution of income increases for chemists (1956 to 1959).

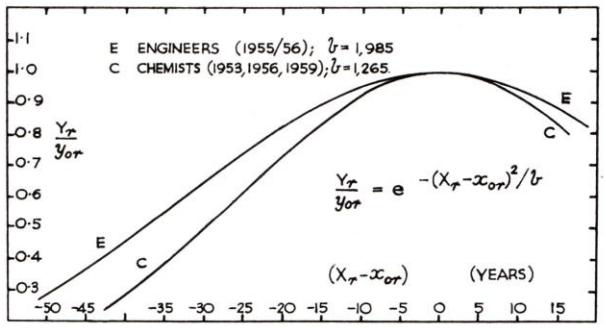

Fig. 16. Comparison between income distributions of chemists and engineers.

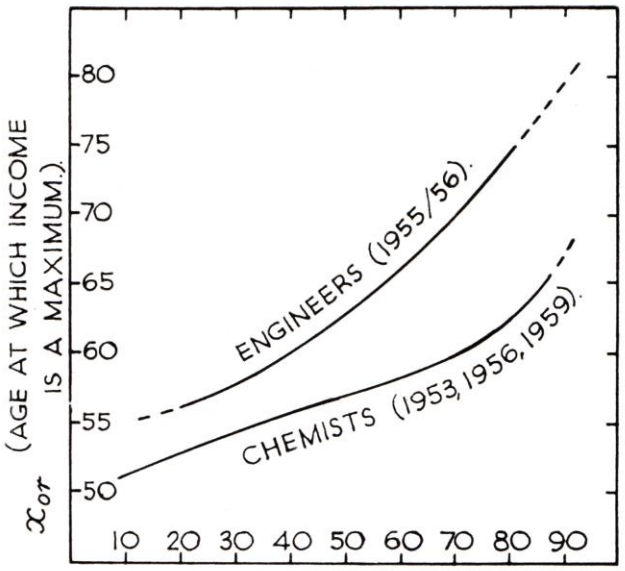

Fig. 17. Distribution of age at which income is a maximum for engineers and chemists.

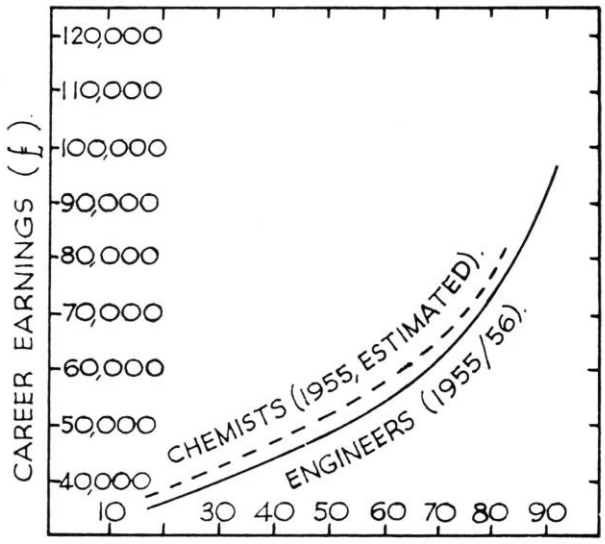

Fig. 18. Comparison between the career earnings distributions of engineers and chemists.

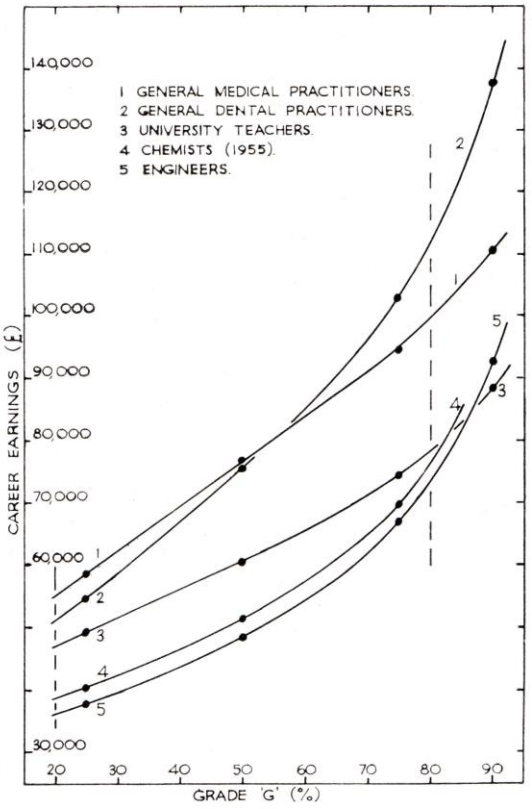

Fig. 19. *Career earnings distributions* (1955/56).

more successful part of the same profession.

For the medical profession, including consultants as well as general medical practitioners, the level of income and incentive would be higher than for the general medical practitioner and any conclusion regarding the medical profession should be based on combined data for consultants and general medical practitioners.

Chemists and engineers do not, on the whole, compare well with university teachers, but the outstanding (*G*85) engineer or chemist earns as much as the equally outstanding university teacher. Quite apart from level of remuneration, most (up to about *G*65) engineers, chemists and university teachers have far less incentive to succeed (that is, to do outstanding work) than the general dental and medical practitioners. And such incentive as is there appears to be in process of still further reduction.

The mean career earnings are listed in Table V, which compares those calculated here with those given in the Report of the Royal Commission[8] which were based on average incomes per age group. The mean career earnings here calculated are lower, particularly for engineers, as they are not influenced to the same extent by the relatively high remuneration of the few highly successful practitioners.

The ratio between mean career earnings is a measure of status. The mean career earnings for a manual employee may be estimated also. For example, the average weekly earnings of all operatives in all industries in October 1955 was £9 7s 2d per week.[9] Assuming that his income is, therefore, about £487 p.a., his career earnings, assuming an effective life of 35 years, which is the same as that of a professional employee, would be about £17,000. Hence we may evaluate the status of professional relative to manual employees for the fiscal year 1955/56. As given in Table V, for example, the status of the engineer compared with that of the manual employee was about 3, the engineer's mean career earnings being about 3 times that of the manual employee.

In arriving at the career earnings of the manual employee, no allowance is made for possible variations in the age distribution of manual employees in different industries or organizations, nor is the ratio of female to male employees considered. Further, the manual employee is fully trained at an earlier age than the professional employee so that a case could be made out for assuming a longer effective life for the manual employee. However, in this article we are concerned with rates of change of status rather than with absolute levels, and in comparing professional with manual employees in general rather than evaluating the position within a particular organization or industry, and it is convenient to choose the same effective life for both manual and professional employees.

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PART II

THE STATUS AND REMUNERATION OF THE PROFESSIONAL MAN IN INDUSTRY

Equations are derived to show how remuneration and status vary with age and with time, allowing also for economic factors. Economic indices are used to illustrate the changing pattern of the national economy and the equations are further developed in terms of such indices. What the individual experiences and feels to be taking place differs from what is taking place, and separate equations are derived for the two cases

by M. DAVIDMANN

Remuneration Mathematics

THE remuneration received by a professional employee from full-time employment may be determined from:

$$Y_r = y_{0r}\, e^{-(X_r - x_{0r})^2/b_r} \qquad \ldots . (5)$$

The suffix r indicates his remuneration in the reference year T_r. The constant b is determined by the individual's group. His grade G within the group determines x_0 and y_0, X being the age of the individual during the year being considered. b, G, x_0 and y_0 may be determined from remuneration surveys; that is, from the national remuneration scale for the reference year.

The remuneration received in any year T_n is given by:

$$Y_n = y_{0n}\, e^{-(X_n - x_{0n})^2/b_n} \qquad \ldots . (6)$$

Consider that the remuneration of the individual's grade is increasing at $100i_p$ per cent compound interest per year, this increase being caused solely by economic factors. Then

$$y_{0n} = y_{0r}\,(1 + i_p)^{T_n - T_r} \qquad \ldots . (7)$$

so that

$$Y_n = y_{0r}\,(1 + i_p)^{T_n - T_r} e^{-(X_n - x_{0n})^2/b_n} \qquad \ldots . (8)$$

When the x_0 distributions and the constant b do not alter appreciably with time for the particular group, as was shown to be the case for chemists, we have for the particular individual and for his grade:

$$Y_r = y_{0r}\, e^{-(X_r - x_0)^2/b} \qquad \ldots . (5a)$$

and

$$Y_n = y_{0r}\,(1 + i_p)^{T_n - T_r} e^{-(X_n - x_0)^2/b} \qquad \ldots . (8a)$$

But, for a single individual:

$$X_n = X_r + (T_n - T_r)$$

and

$$T_n - T_r = X_n - X_r$$

Hence, in terms of time:

$$Y_n = y_{0r}\,(1 + i_p)^{T_n - T_r} e^{-(X_r + T_n - T_r - x_0)^2/b} \qquad \ldots . (8b)$$

and, in terms of age:

$$Y_n = y_{0r}\,(1 + i_p)^{X_n - X_r} e^{-(X_n - x_0)^2/b} \qquad \ldots . (8c)$$

It should be particularly noted that Equations (8b) and (8c) apply only to a single individual.

Equation (8), in any of its forms, gives the iso-grade lines for individuals. The remuneration of a professional employee increases in accordance with this equation as long as he receives neither promotion nor demotion, that is as long as he remains in his particular grade. The equation gives the remuneration he receives as he grows older and is here referred to as the "dynamic iso-grade" remuneration equation. Equation (5) or (6), however, gives the remuneration of individuals of different ages, of the same grade, at a particular time, and is referred to here as the "static iso-grade" remuneration equation. Equations (5), (6) and (8), in their various forms, apply to professional employees.

The fully trained manual employee receives the rate for his grade, irrespective of age and leaving out of consideration special rewards such as "fringe benefits" for long service. His remuneration depends on economic factors, but not on age. Hence

$$x_0 = X \qquad \ldots . (9)$$

so that, from Equation (5) or (6), we see that, for any particular year, and by definition:

$$E = Y = y_0 \qquad \ldots . (10)$$

Suppose that the remuneration of the manual employee's grade is increasing at rate $100i_m$ per cent compound interest per year, this change in remuneration being caused by economic factors such as altered rates and differences in hours worked. The remuneration received by a manual employee is given by:

$$E_n = E_r\,(1 + i_m)^{T_n - T_r} \qquad \ldots . (11)$$

Equation (10) is the static iso-grade equation, and Equation (11) the dynamic iso-grade remuneration equation, for manual employees.

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Status Mathematics

Status is relative and is evaluated as the ratio of remunerations. Status between individuals and thus between their grades may be evaluated as shown below.

Let S be the status between two individuals. The status of individual 1 relative to individual 2 is then given by the ratio of the remuneration received by individual 1 to that received by individual 2, denoted by S_{12}, it being convenient to arrange the ratio so that S_{12} is greater than unity.

It follows that:

$$\frac{S_{13}}{S_{23}} = S_{12} \qquad \ldots . (12)$$

The relations developed below apply equally to individuals in different grades within the same group as to individuals and their grades from different groups.

Static status is that between individuals and their grades in any particular year. The static status equations developed here show how status varies with age for individuals in the grades being considered, in a particular year.

For static status between professional employees, from Equation (5a) we have:

$$S_{12r} = \frac{Y_{1r}}{Y_{2r}} \qquad \ldots . (13)$$

$$= \frac{(y_{0r}\ e^{-(X_r - x_0)^2/b})_1}{(y_{0r}\ e^{-(X_r - x_0)^2/b})_2} \qquad \ldots . (14)$$

By definition the static status of manual employees relative to each other is given by:

$$S_{12r} = \frac{E_{1r}}{E_{2r}} \qquad \ldots . (15)$$

Similarly, the static status between professional and manual employees is:

$$S_{12r} = \frac{Y_{1r}}{E_{2r}} \qquad \ldots . (16)$$

$$= \frac{(y_{0r}\ e^{-(X_r - x_0)^2/b})_1}{E_{2r}} \qquad \ldots . (17)$$

The dynamic status equations show how status changes as the individual grows older, assuming that he remains in his grade, receiving neither promotion nor demotion. These dynamic status equations show the status changes which the individual feels are taking place as he grows older and thus portray his own progress as he sees it.

The dynamic status between professional employees, from Equation (8a), is:

$$S_{12n} = \frac{Y_{1n}}{Y_{2n}} \qquad \ldots . (18)$$

$$= \frac{(y_{0r}\ (1 + i_p)^{T_n - T_r}\ e^{-(X_n - x_0)^2/b})_1}{(y_{0r}\ (1 + i_p)^{T_n - T_r}\ e^{-(X_n - x_0)^2/b})_2} \qquad \ldots . (19)$$

The dynamic status of manual employees with respect to each other, from Equation (11), is:

$$S_{12n} = \frac{E_{1n}}{E_{2n}} \qquad \ldots . (20)$$

$$= \frac{(E_r\ (1 + i_m)^{T_n - T_r})_1}{(E_r\ (1 + i_m)^{T_n - T_r})_2} \qquad \ldots . (21)$$

Similarly, the dynamic status of professional relative to manual employees is given by:

$$S_{12n} = \frac{Y_{1n}}{E_{2n}} \qquad \ldots . (22)$$

$$= \frac{(y_{0r}\ (1 + i_p)^{T_n - T_r}\ e^{-(X_n - x_0)^2/b})_1}{(E_r\ (1 + i_m)^{T_n - T_r})_2} \qquad \ldots . (23)$$

The use of these equations is straightforward. For example, Equation (19) may be used to compare different grades within one profession or the same grades in different professions, to see how individuals feel their own progress. Equation (17) may be used for comparing professional employees with manual employees for a particular year. Equation (23) may be used to compare professional with manual employees to see how they feel their status changing as they grow older.

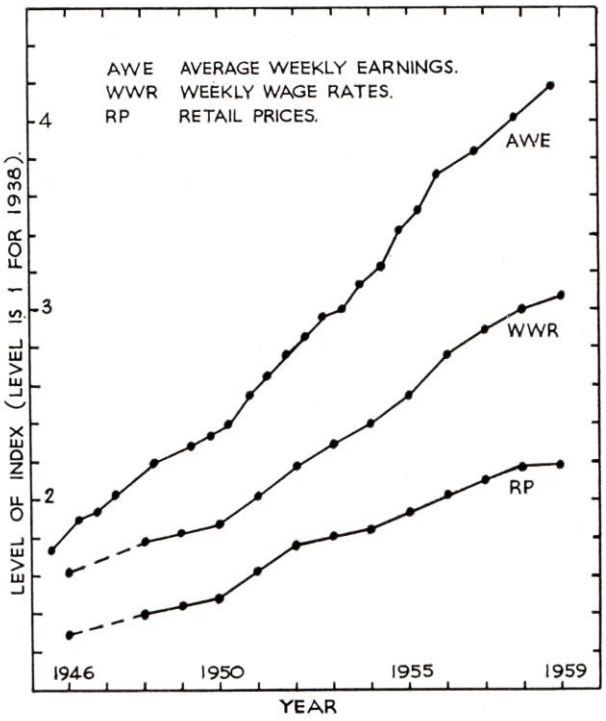

Fig. 20. Economic indices for manual employees.

So far we have set up the static status equations which show status as it exists in a particular year, and we have also established the dynamic status equations which show the changes in status which individuals feel are taking place. However, we still have to see how status actually alters with time.

Let I_{12s} be the status index, defined by the ratio S_{12n}/S_{12r}. The status at any particular year is then given as a ratio to that for the same age in the reference year, and the status index I_{12s} thus evaluates the factual changes in status which are taking place. For example, considering a particular grade in a profession and a manual employee, utilizing Equations (23) and (17), we have:

$$\text{status index} = \frac{S_{12n}}{S_{12r}} \qquad \ldots . (24)$$

$$= \frac{\dfrac{y_{0r}}{E_r}\left(\dfrac{1 + i_p}{1 + i_m}\right)^{T_n - T_r} e^{-(X_n - x_0)^2/b}}{\dfrac{y_{0r}}{E_r}\ e^{-(X_r - x_0)^2/b}}$$

$$= \left(\frac{1 + i_p}{1 + i_m}\right)^{T_n - T_r} \frac{e^{-(X_n - x_0)^2/b}}{e^{-(X_r - x_0)^2/b}} \qquad \ldots . (25)$$

Status at age X_n during year T_n has to be compared with status at age X_n during year T_r, so that

$$X_r = X_n$$

and Equation (25) becomes

$$I_{12s} = \left(\frac{1 + i_p}{1 + i_m}\right)^{T_n - T_r} \qquad \ldots . (26)$$

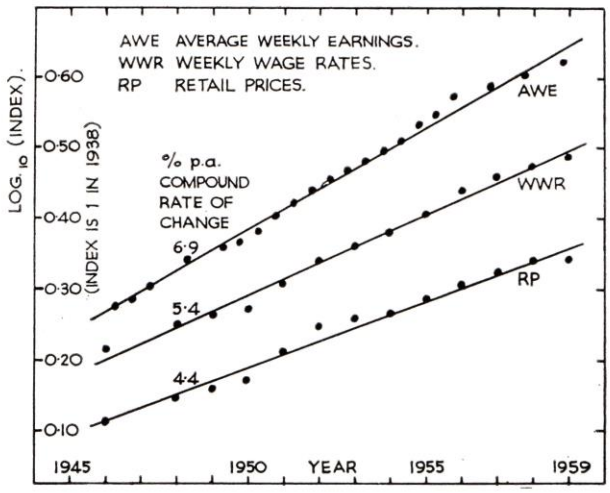

Fig. 21. Economic indices for manual employees.

Equation (26) is general and, for the general case, we have

$$I_{12s} = \left(\frac{1+i_1}{1+i_2}\right)^{T_n - T_r} \qquad \ldots.(27)$$

When the remuneration of both increases at the same percentage rate, the status of one relative to the other remains constant. When their remuneration increases at different rates, status changes, increasing or decreasing as i_1 or i_2, respectively, is the greater rate.

Knowing the rates at which remuneration is increasing, one may immediately compute gain or loss of status with Equation (27).

The status index I_{12s} is the status in the year T_n divided by what the status was in the year T_r and the status index may be interpreted as giving the status in the year T_n on the basis that the status in the year T_r was unity.

By definition

$$I_{12s} = \frac{S_{12n}}{S_{12r}}$$

so that for year T_r we have

$$I_{12s} = \frac{S_{12r}}{S_{12r}} = 1 \qquad \ldots.(28)$$

It is worth noting that

$$\frac{I_{13s}}{I_{23s}} = I_{12s} \qquad \ldots.(29)$$

Use of Indices

One may not always be justified in assuming that remuneration increases at constant or average compound interest rates, and indices can then be used to calculate the year-by-year changes.

For professional employees consider two successive remuneration surveys, one taken in year T_r and the other in year T_n:

$$Y_r = y_{0r}\, e^{-(X_r - x_0)^2/b} \qquad \ldots.(5a)$$

$$Y_n = y_{0n}\, e^{-(X_n - x_0)^2/b} \qquad \ldots.(5b)$$

so that

$$\frac{Y_n}{Y_r} = \left(\frac{y_{0n}}{y_{0r}}\right)\left(\frac{e^{-(X_n - x_0)^2/b}}{e^{-(X_r - x_0)^2/b}}\right) \qquad \ldots.(30)$$

The remuneration index for professional employees, I_p, should be a measure of changes in remuneration due to economic conditions. It thus has to be a ratio which is independent of the position of the individual, as this changes with his age, so that remuneration at age X_n during year T_n has to be compared with remuneration received by an individual of the same age but during year T_r. Hence

$$X_n = X_r$$

and Equation (30) becomes

$$\left(\frac{Y_n}{Y_r}\right)_X = \frac{y_{0n}}{y_{0r}}$$

so that we define

$$I_p = \left(\frac{Y_n}{Y_r}\right)_X = \frac{y_{0n}}{y_{0r}} \qquad \ldots.(31)$$

Note that

$$y_{0n} = y_{0r}\,(1 + i_p)^{T_n - T_r} \qquad \ldots.(7)$$

so that

$$I_p = \frac{y_{0n}}{y_{0r}} \qquad \ldots.(32a)$$

$$= (1 + i_p)^{T_n - T_r} \qquad \ldots.(32b)$$

Note that, from Equation (30), we have

$$Y_n = \left(\frac{y_{0n}}{y_{0r}}\right)\left(\frac{e^{-(X_n - x_0)^2/b}}{e^{-(X_r - x_0)^2/b}}\right)(Y_r)$$

$$= (I_p)\left(\frac{e^{-(X_n - x_0)^2/b}}{e^{-(X_r - x_0)^2/b}}\right)(Y_r) \qquad \ldots.(33)$$

and also that

$$I_p = \left(\frac{Y_n}{Y_r}\right)\left(\frac{e^{-(X_r - x_0)^2/b}}{e^{-(X_n - x_0)^2/b}}\right) \qquad \ldots.(34)$$

Equation (33), which corresponds to Equation (8a), is used to calculate or predict an individual's remuneration when I_p is known, say from two successive surveys which gave y_{0r} and y_{0n}. The career earnings ratio for the grade for the two surveys also gives the y_0-ratio in Equation (31).

Symbols Used

b = constant, defining the distribution of remuneration with age, for a particular group or subgroup;
i = rate of change, per cent compound rate of change per year, generally expressed as a fraction;
x_0 = age at which remuneration is a maximum, for a particular grade;
y_0 = maximum level of remuneration, at age x_0;
C = career or mean career earnings (£);
E = remuneration received by manual employee during one year, preferably the fiscal year (£);
G = fraction (per cent) = grade. For example, $G75$ = grade 75 per cent when fraction = 75 per cent.
I = index, preferably used on the basis that $I = 1$ in the reference year.
S = status, that is remuneration ratio;
S_{12} = status, ratio of remuneration of subject "1" to subject "2", with S_{12} preferably $\geqq 1$.
T = time, that is year, for example: 1960. Either fiscal or calendar year, preferably fiscal year;
X = age (years);
Y = remuneration received by professional employee during one year, preferably the fiscal year (£).

Suffixes

g = grade;
m = manual employee;
n = any particular year;
p = professional employee;
r = reference year, for example year to which survey refers or in which a particular index is 1;
s = status;
R = reference year of economic index;
X = at constant age.

I_p may also be estimated from other data relating to, for example, cost of living. Equation (34) enables one to separate, for a particular individual, that part of any change of remuneration which corresponds to the changing economic situation.

For the manual employee, let I_m be an index which estimates the remuneration he receives. It is defined as the ratio of remuneration received in any particular year to that in a specific reference year. Let the reference year on which this index is based be denoted by the suffix R. Hence, by definition, we have:

$$I_{mn} = \frac{E_n}{E_R} \qquad \ldots . (35)$$

and

$$I_{mr} = \frac{E_r}{E_R} \qquad \ldots . (36)$$

so that

$$\frac{E_n}{E_r} = \frac{I_{mn}}{I_{mr}} \qquad \ldots . (37)$$

and

$$E_n = \frac{I_{mn}}{I_{mr}} E_r \qquad \ldots . (38)$$

Equations (37) and (38) apply as long as the basic reference year T_R on which the index is based remains the same. Where T_R for an index changes during the period under consideration, the index has to be recalculated to satisfy this condition before Equations (37) and (38) can be used.

Note that

$$E_n = E_r (1 + i_m)^{T_n - T_r} \qquad \ldots . (11)$$

so that, from Equation (38), we have

$$\frac{I_{mn}}{I_{mr}} = (1 + i_m)^{T_n - T_r} \qquad \ldots . (39)$$

Equations (32b), (38) and (39) enable one readily to restate the previously derived equations in terms of remuneration and economic indices. For example, the status index I_{pms} may be derived from Equation (27), thus:

$$I_{pms} = \left(\frac{1 + i_p}{1 + i_m}\right)^{T_n - T_r} = (I_p)\left(\frac{I_{mr}}{I_{mn}}\right) \qquad \ldots . (40)$$

Grades within one group of professional employees may be compared with each other and with manual employees by the equations given so far, but career earnings could be used equally well, when available, in the same way as described below for mean career earnings. However, mean career earnings have to be used when comparing different groups, such as professions, with each other. Calculations based on mean career earnings may be carried out on the following basis:

$$S_{12r} = \frac{C_{1r}}{C_{2r}} \qquad \ldots . (41)$$

and

$$S_{12n} = \frac{C_{1n}}{C_{2n}} \qquad \ldots . (42)$$

so that

$$I_{12s} = \frac{S_{12n}}{S_{12r}} \qquad \ldots . (43)$$

$$= \frac{C_{1n}}{C_{1r}} \Big/ \frac{C_{2n}}{C_{2r}} \qquad \ldots . (44)$$

But

$$\frac{C_n}{C_r} = (1 + i)^{T_n - T} \qquad \ldots . (45)$$

and again we see that

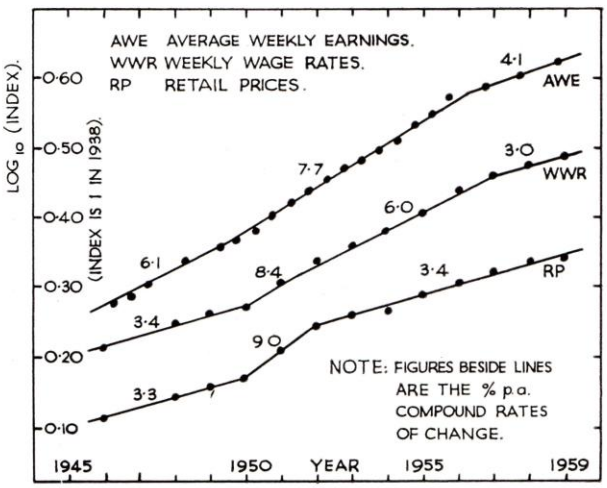

Fig. 22. Economic indices for manual employees.

$$I_{12s} = \left(\frac{1 + i_1}{1 + i_2}\right)^{T_n - T_r} \qquad \ldots . (27)$$

Equations (32b) and (39) may be applied when calculations in terms of indices are to be carried out.

The Changing Pattern of the Economy

Economic indices portray the changing pattern of the economy and may be used to illustrate it, bearing in mind their limitations. The indices used here are those collected and published by the Central Statistical Office,[9] indicating changes in average weekly earnings, in weekly wage rates and in retail prices.

The index of retail prices is a measure of the cost of living. It measured,[10] up to 1956, changes in the average level of prices for goods and services required by working-class families, but from 1956 onwards by practically all wage earners and most small and medium salary earners. The index used here is that for all the items that go to make it up. One may regard such changes in composition of the index as reflecting changes in the pattern of expenditure rather than fundamental changes of the index. As the pattern of expenditure alters, so in due course the index is adjusted as well.

The index of weekly wage rates[10] is a measure of the level of full-time weekly wage rates for manual employees in 80 industries and services. Piece-work rates as well as time rates are included. The index used here is that for all workers and all industries and services.

The index of average weekly earnings[10] is a measure of the combined effect of changes in overtime rates and hours worked as well as wage rates, but is also dependent on the distribution of workers amongst the industries concerned, and on the composition of the working population with respect to age and sex. The index used here is that for all operatives and all industries.

It is seen from the way in which the indices were selected that we are here concerned with illustrating a general case with what information is available, rather than with calculating more exact data for a particular industry. Indices are linked without regard to changes in composition, such changes being taken to accord with the changing economic pattern. We are concerned with rates of change rather than with actual levels, and such rates are independent of the way in which the indices are linked or of the reference year on which the index is based. The indices used here were linked and recalculated to the reference year 1938. They are illustrated by Fig. 20, which shows the three indices with which we are concerned, recalculated on the basis that the index is 1 in each case for the year 1938.

Changes occur on the basis of the pattern at the time rather than on the pattern as it was in an arbitrary reference year. Hence indices change in each year, this change being based on the level of the index obtaining at the time rather than the level in the reference year. The indices thus advance in accordance with the compound interest law. This may be illustrated by plotting the logarithm of the index against time, when the gradient of the line joining any two points measures the compound rate of change between them. Fig. 21 shows the indices plotted in this way. For the period 1946-59, for the manual employee, prices increased at about 4.4 per cent, wage rates at about 5.4 per cent and remuneration at about 6.9 per cent, these being compound rates of change. The standard of living of the manual employee, as judged by remuneration, thus increased at about 2.5 per cent compound rate of change per year.

The compound rates of change are, however, more accurately represented as illustrated by Fig. 22, which is of interest when considering the more immediate past. During the period 1952-56 prices increased by about 3.4 per cent, wage rates by about 6.0 per cent, remuneration by about 7.7 per cent and standard of living by about 4.3 per cent, these being compound rates of change per year. More recently, since 1956, prices have increased at about the same rate as before, but wage rates increased at about 3.0 per cent p.a., remuneration at about 4.1 per cent p.a. and standard of living at about 0.7 per cent p.a.

For ease of reference, the compound rates of change, in per cent per year, are given below in the form of a table:

Period	Prices	Wage Rates	Earnings
1952–56	3.4	6.0	7.7
1956–59	3.4	3.0	4.1
1946–59	4.4	5.4	6.9

The References to this article were published with Part I (July).

PART III

THE STATUS AND REMUNERATION OF THE PROFESSIONAL MAN IN INDUSTRY

It is shown that the professional employee, at the start of his career, ought to expect considerable increases in remuneration and status. Instead, he has to work at an ever-higher level of experience and responsibility merely to maintain his position. It is further shown that he is losing ground continually, not because of income taxation as appears to him, but because increases for economic factors are determined by manual employees' wages rates instead of by their earnings. There is thus no incentive for the individual professional employee to utilize his experience and to carry greater responsibility. The article further discusses how changes in "basic week" and "paid holidays" affects the status between professional and manual employees

by M. DAVIDMANN

Changes in Status in the Course of Time

WE are here concerned with the individual's changes in remuneration and status, throughout his life. We thus use the dynamic status equations. Status is measured by the remuneration ratio and may be computed from remuneration received by the individual either before or after deducting income tax. Status is normally measured by remuneration before deducting income tax, but is here evaluated also for remuneration after deduction of income tax, so as to evaluate the effect of this taxation on the status of the individual. We are considering employees only, that is those whose main, and mostly sole, income is derived from full-time employment.

Two grades of chemist are considered in relation to a manual employee whose remuneration is assumed to correspond to earning the average weekly earnings[9] for 52 weeks per year. The two grades considered are G25 and G75, corresponding to moderate and considerable success respectively.

The individual in each case is assumed to be married at age 27, the first child being born in the fourth year after marriage, the second child being born in the seventh year after marriage. He is 40 years of age in 1959, and thus marries during 1946, the two children being born in 1950 and 1953 respectively. He remains married during the entire period we are considering, which is from 1949-69.

In calculating income tax, it is assumed that the remuneration received consists entirely of earned income. The appropriate earned income, single or married personal and child allowances are given. Up to 1960 the known rates and bands of allowances, tax and surtax were used; from 1960-69 those applicable in 1960 were assumed. The wife was assumed to have no income and factors such as family allowance or national insurance contributions were not considered.

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It is assumed that b and the x_0 distribution remain constant throughout the period being considered, that is from 1949-69, this having been shown to be the case for the period 1953-59, the level of b being 1265. The compound rate of change, i_p, was found to be 5.9 and 4.4 per cent per year over the period 1956-59, for chemists of grade G25 and G75 respectively. It is here assumed that these rates of change apply throughout the period being considered. The data used for estimating the remuneration of chemists are those obtained from the 1959 remuneration survey, as follows:

Grade	G25	G75
x_0	53·4	61·0
y_{0r}(£)	1630	2930

We have seen that the remuneration of manual employees (all industries, all operatives) increased at an average compound rate of 6.9 per cent each year during the period 1946-59. It is here assumed that this rate applies over the period 1949-69. The average weekly earnings in 1938 were 53s. 3d. and, assuming this is earned for 52 weeks of the year, we have

$$E_R = \frac{52 \times 53.25}{20} = £138.5 \text{ p.a.}$$

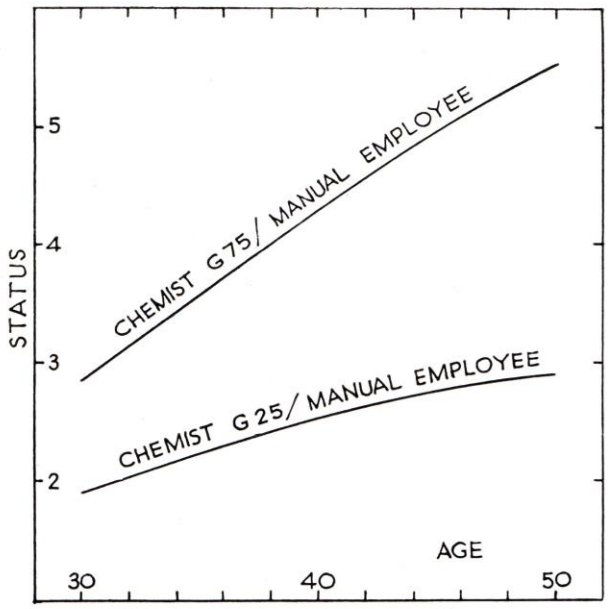
The equation of the straight line which correlates the index of average weekly earnings (Fig. 21) is:

$$\log_{10} I_{mn} = 0.2399 + 0.02902\ (T_n - 1945) \quad \ldots . (46)$$

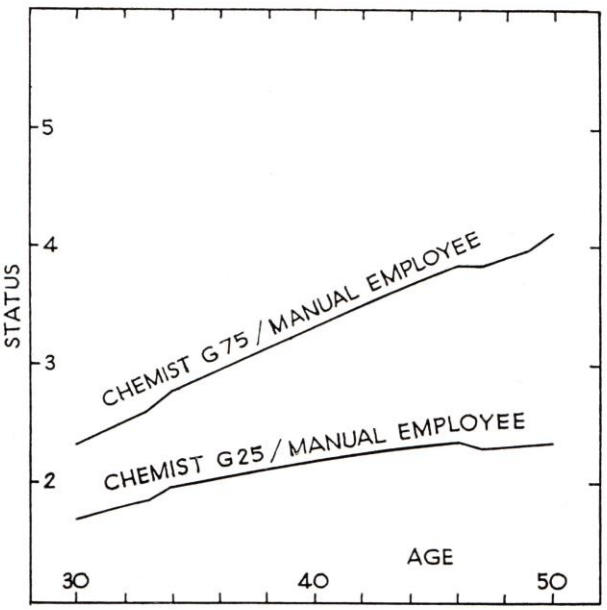
Hence the remuneration of the manual employee may be calculated from Equation (35), since

$$E_n = E_R I_{mn} \quad \ldots . (35a)$$

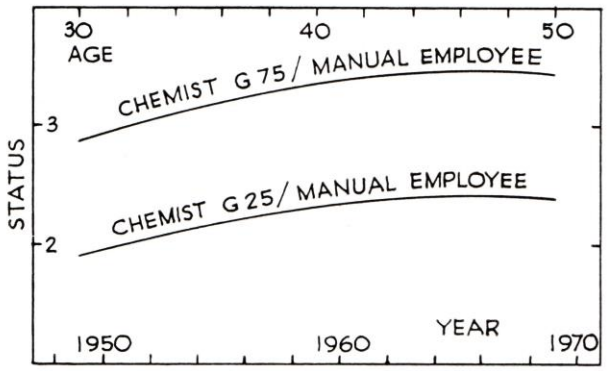
Thus during 1949 the manual employee received a remuneration of £314. The remuneration of the chemists may be calculated for the year 1959, for each grade, from Equation (5a). From Equation (7) we have



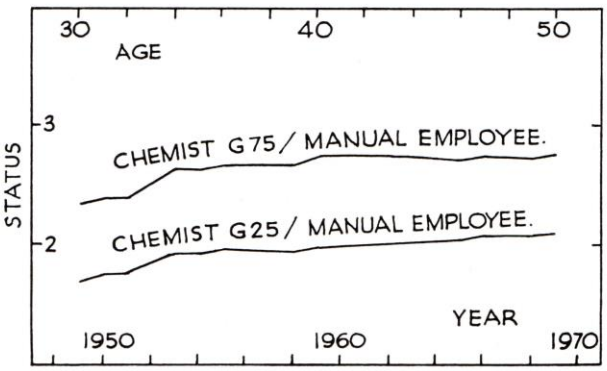
23 *Static status for year 1949 based on earned income before deducting income tax.*



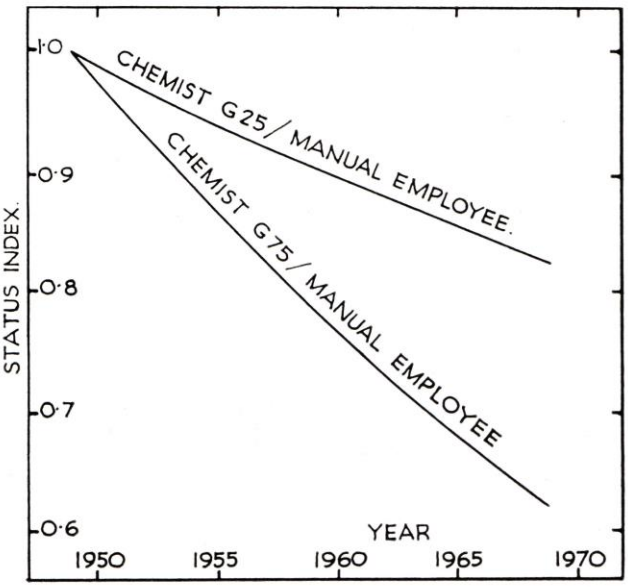
24 *Static staus for year 1949 based on earned income after deducting income tax.*



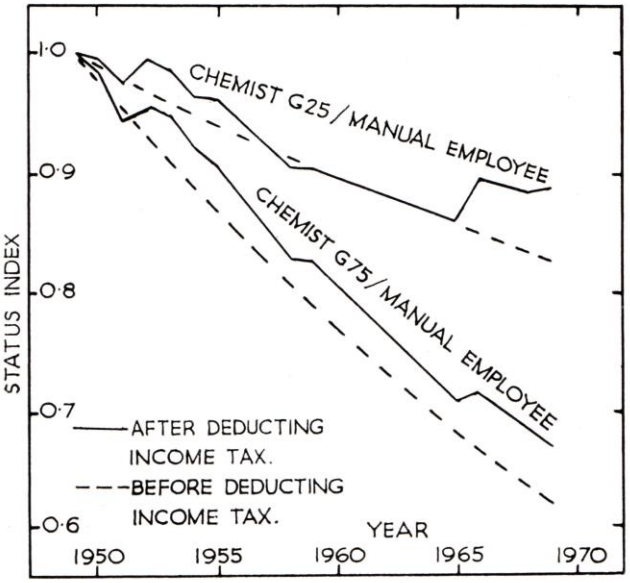
25 *Dynamic status based on earned income before deducting income tax.*



26 *Dynamic status based on earned income after deducting income tax.*



27 *Status index for professional relative to manual employee, based on earned income before deducting income tax.*



28 *Status index for professional relative to manual employee, based on earned income.*

$$\frac{y_{0n}}{y_{0r}} = (1 + i_p)^{T_n - T} \quad \ldots . (7a)$$

and hence the remuneration of the chemists, at any specific age, is 0.564 and 0.652, in 1949 of that in 1959, for grades G25 and G75 respectively. Knowing the remuneration of the chemists and of the manual employee in 1949, we may then calculate static status for the year 1949 by Equation (16), and we may do this both before and after deduction of income tax.

The results of such calculations are illustrated by Figs. 23 and 24, before and after deducting income tax, respectively. Higher remuneration is taxed to a greater extent than lower remuneration and to that extent status after tax deduction is somewhat lower than before tax is deducted, and the higher the remuneration the greater is the reduction of status due to income taxation. This is as expected. However, the significant feature which is common, no matter whether status is considered before or after tax deduction, is that the chemist in 1949 could look at his equals and expect very considerable increases of remuneration and of status, as he grew older, as a reward for increased experience and responsibility carried, in accordance with his grade.

We may now consider what happens as the individual grows older. The remuneration of the manual employee can be calculated from Equation (35a) and that for the chemists from Equation (8a). The ratio between them (Equation (22)) gives the dynamic status, which could have been calculated from Equation (23) had we not been concerned with deduction of income tax.

The results of such calculations are illustrated by Fig. 25 for remuneration as earned, and by Fig. 26 for remuneration received after deduction of income tax. Consider Fig. 25. The chemists' status, before deducton of tax, appears to increase, in accordance with expectations, as the individuals grow older. But Fig. 26 shows that to the individual it appears that the effect of taxation is to counteract and nullify any increase in status from about age 34 onwards. The individual professional employee feels that he must work at a constantly higher level, carrying increasing responsibility, receiving an ever-higher remuneration, in order just to maintain his position in society, and that this state of affairs is caused by the incidence of income taxation. The individual feels that it is income taxation which is depressing the status of the professional employee. This, then, is the subjective situation.

Actual changes in status, however, are measured by the status index. The status at any particular year is given as a ratio to that for the same age in the reference year. The status index may be evaluated by using Equation (26) when considering remuneration before deduction of income tax, and Equation (24) when considering remuneration after income tax has been deducted. Fig. 27 shows how in fact status changes over the period being considered. The index indicates that status of professional relative to manual employees is falling steadily throughout the period, when remuneration before deduction of tax is considered. Fig. 28 shows that the actual effect of taxation is to counteract to some small extent the erosion of status which is taking place. This loss of status is such that a chemist, 40 years of age in 1959 and of grade G75, his remuneration then being about £2070 p.a., would require an increment of £560 in 1959, in addition to what he is receiving, to restore his status to the 1949 level, not considering the effect of income taxation or any change in status between 1938 and 1949.

The status of the professional employee is continually decreasing. He has to work at an ever-higher level of responsibility merely so as to maintain his position in society, thus carrying greater responsibility without real reward. It is this which accounts to some considerable extent for the frustration felt at present by professional employees in industry. This loss of status is in no way caused by the incidence of income taxation, but is due to the fact that the professional employee does not receive sufficiently high increments to reward him for the additional responsibility carried and to give him an increased standard corresponding to that received by manual employees. No comment is made here on just what level of status ought to be maintained for professional relative to manual employees; but it cannot be emphasized too strongly that the redistribution of remuneration, that is, the reduction of status, is proceeding at such a pace that there is no positive incentive for the professional employee to carry greater responsibility, as he has to carry greater responsibility merely to maintain his position in society.

Changes in Remuneration of Individuals in the Course of Time

A salaried individual professional employee may compare his own progress with that of others of his own grade, not only between surveys, but year by year. He may do this by arriving at a realistic representation of his own remuneration and by comparing this with calculated remuneration over a few years. The only individual data required for carrying out the calculations, in addition to the National Remuneration Scale for his profession, are his age and remuneration in a particular year. What matters is how his remuneration continues to compare with others of the same grade.

In the first place a curve is drawn of remuneration against time. The remuneration scale is in £ p.a. and the time scale is given in years and months. This method of plotting remuneration is illustrated by Fig. 29 and it should be noted that it is an exact representation of earned income, the area under the curve representing remuneration received. It is the mid-points of the horizontal lines which have to be joined (Fig. 30) to show how remuneration is progressing. Where month-to-month data are not available, or not applicable, remuneration received per calendar or fiscal year, as the case may be, may be plotted against the year (Fig. 31).

The grade and its maximum remuneration (y_{0r}) is obtained from the National Remuneration Scale for the individual, and his remuneration may then be calculated by any of the dynamic remuneration equations given earlier on. The example illustrated by Figs. 29 to 31 shows such calculations made by means of equation:

$$Y_n = y_{0r} I_p \, e^{-(X_n - x_0)^2/b} \quad \ldots . (47)$$

which is derived from Equations (5b) and (32a). The index of remuneration, I_p, is assumed to be equal to that for manual employees:

$$I_p = \frac{Y_n}{Y_r} = \frac{E_n}{E_r} = \frac{I_{mn}}{I_{mr}} \quad \ldots . (48)$$

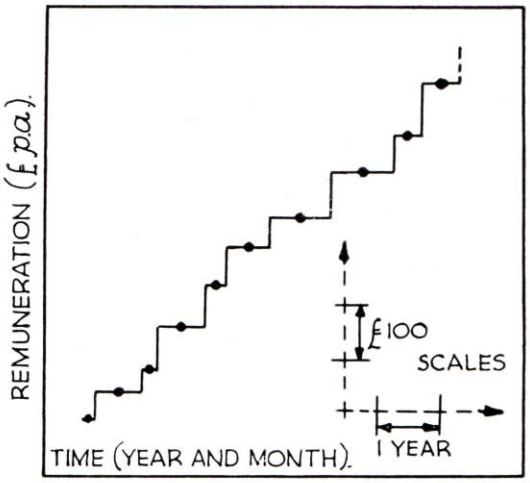
The particular index chosen is the index of weekly wage rates[10] as discussed previously, and the value of

$$e^{-(X_n - x_0)^2/b}$$

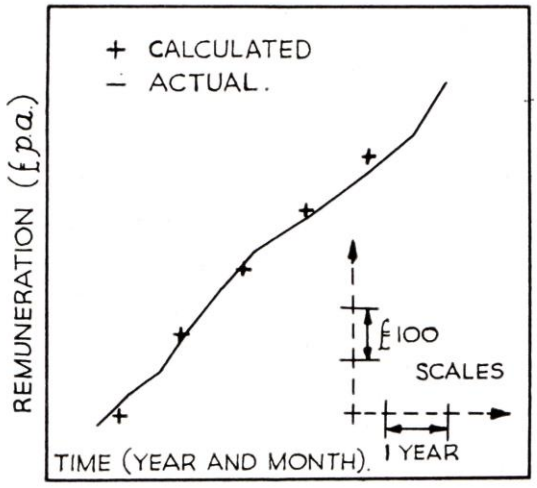
may be readily evaluated from a curve of the basic remuneration distribution, as given in Fig. 16.

One may quickly estimate one's own progress in relation to that of others of the same grade, using the data obtained by the last survey. This "*do-it-yourself*" method is, however, limited by the accuracy with which the data may be read from the curves provided. It is illustrated by Table VI. The example chosen for illustration is that of an engineer 45 years of age in 1955/56, then earning £1500 p.a. Fig. 12 gives his grade and his income as he grows older, assuming economic factors to remain constant. These are then allowed for by computing the index ratio and multiplying this by the income in the year of the survey.

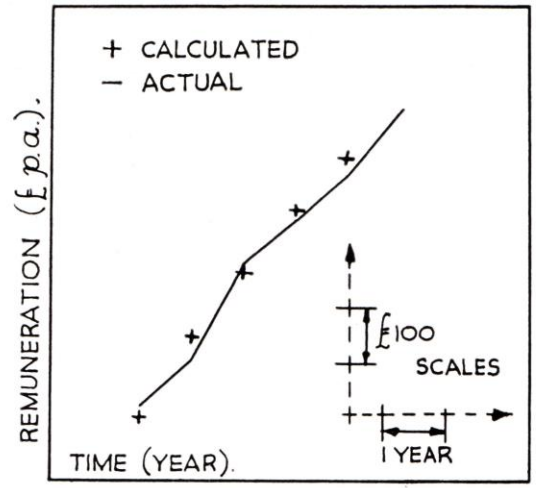
Inspection of Figs 30 and 31 reveals that there is close



29 *Remuneration of an individual.*



30 *Comparison between remuneration received by an individual and by others of the same grade in the same profession.*



31 *Comparison between annual remuneration received by an individual and by others of the same grade in the same profession.*

correspondence between actual and calculated remuneration for the individual professional employee whose case is illustrated. He is receiving neither promotion nor demotion and progressing, on the whole, at the same pace as others in his grade. His remuneration may be calculated with very reasonable accuracy as long as he remains in his grade. A number of such calculations have been carried out and point to the conclusion that the index of weekly wage rates may be used with a reasonable degree of confidence in making such calculations where the basic remuneration scale is unaffected by changes in the supply versus demand pattern. The employer's attention is focused on negotiations concerning wage rates and his professional employees (including executive directors) receive corresponding increases. But we have seen (Fig. 21) that the manual employees' wage rates increase at about 5.4 per cent per annum, whereas corresponding earnings increase at about 6.9 per cent per annum, and it is this difference between wage rates and earnings, combined with professional employees receiving "cost-of-living" increments which correspond to increases in wage rates, which explains the falling status of the professional employee. On the other hand, should he be willing to accept the index of average weekly earnings, then his remuneration would depend to that extent on the state of the national economy, thus giving the professional employee some considerable stake, and thus incentive, in the well-being of the national economy.

JEWKES[8] has said that between 1939 and 1951 prices increased by 100 per cent. He cited the DANKWERTS award to support this figure. But MR. JUSTICE DANKWERTS' betterment factor of 100 per cent did not concern itself with prices, but with income.[18] Earnings of professional employees, and not prices, had increased by about 100 per cent. However, we have seen that the remuneration of professional employees has increased in accordance with wage rates for manual employees, but not in accordance with the earnings of manual employees. The indices[9] for 1951, based on a value of 1.00 for 1938, show that MR. JUSTICE DANKWERTS' betterment factor is in complete agreement with this. In 1951 the indices for manual employees were roughly as follows: wage rates: 2.02, earnings: 2.60, prices: 1.62.

Remuneration and Status

Some remuneration surveys are based on rate of earning at a specified date, others on income received during a fiscal year. A standard basis is required, particularly when remuneration is to be used for evaluating status. As long as one considers status as being measured by a remuneration ratio, it is income earned which matters and not a wage rate which, in the normal overall case, gives no guide on status.

The remuneration of the professional chemists surveyed[1, 2, 4] was that from salaried and/or professional services, that is the gross earned income. The individual's national insurance or superannuation contributions were not deducted, and his employer's superannuation contributions, where made, were not added. Retirement pension from previous employment was to be included. There also had to be included additional remuneration such as bonus, share in profits, allowances other than expenses, value of free quarters provided and remuneration derived from professional services consistent with but not part of the employment, such as from external examining or advisory work by a university teacher. The salary was to be that as at 1 April (1955) or 1 May (1956) or the earnings in the fiscal year ended 5 April. The Engineers Joint Council (U.S.A.)[12, 13, 14] considers that remuneration is the base salary including cost of living allowance, if any, plus bonus if considered part of salary, but not including payments for overtime work. The

remuneration survey for engineers[5, 8] analysed income during the fiscal year.

As regards computation of earned income, overtime should be included, as status is determined by total earned income. We know the cases of reluctance to transfer from an overtime-paying level of position to the next non-overtime paying higher level, where this results in some loss of income. Another case is that of engineers working on site, where the engineer who receives overtime works in many instances shorter hours and carries less responsibility than the senior engineer in charge, but receives the higher remuneration by virtue of his overtime payments.

It is total income (that is, earnings) which is a measure of status and not wage rates. Conditions of employment may be altered for manual employees by changes in the "basic week" worked. This is no more than an increase in earnings which is independent of wage rates. An increase in a wage-rate is comparatively unconditional, whereas a reduction in the number of hours which make up the basic working week is an increase in earnings which depends on the well-being of the economy. When the number of overtime hours worked each week remains constant, then earnings are increased; when less work is available, earnings fall.

A reduction in the working week for the salaried employee who receives pay for overtime means a similar increase in earnings which is conditional upon the work available. The employee in the more responsible position who receives no overtime pay has not gained, but lost. The amount of work is not reduced and his status, as measured by income, has been reduced by the reduction in working hours. Hence an increase in income earned by reduction in basic working hours for manual employees should be accompanied by a corresponding increase in remuneration for the non-overtime-paid employee, the salaried employee who receives pay for overtime being in a somewhat intermediate position, dependent on the regularity with which overtime is being worked.

As the carrying of responsibility is being paid for in the case of the professional employee, it follows that not only should he receive an increase corresponding to the increase in earnings which the manual employee receives as a result, but the number of hours worked by the professional employee should be reduced as well, corresponding to the reduction in hours of the basic working week. In the event of general economic misfortune, when no overtime is being worked, the manual employee falls back on to his basic working week. Where the professional employee's remuneration is dependent on the earnings of the manual employee, by using an index of average earnings for manual employees, the professional employee shares the misfortune of the manual employee, but cannot be asked to do this unless he has received the initial increase in remuneration as well as a reduction in working hours. Where the index of earnings is used to maintain the professional employee's status, compensation is automatic. The manual employee works a shorter basic week, the professional employee works a correspondingly shorter week. Any consequent gain in income by the manual employees is shared by the professional employee through adjustment of his income using the index of earnings, and both share equally in the state of the national economy, the professional employee lagging behind the manual employee to the extent of the time required to compile, publish and apply the index.

Another question which arises is that of holidays. When the holidays with pay of manual employees were increased, those of professional employees were not, as a rule, increased in proportion. It is suggested here that remuneration be expressed, for the purpose of comparison, as an annual income based on 52 weeks, as if all the income had been earned in the number of weeks actually worked, that is, earned in 52 weeks minus the number of weeks' holiday to which the employee is entitled. For example, an income of £500 in one year which included two weeks' holiday becomes £500 × 52/50, the remuneration received for the holiday period having been included in the initial £500.

Also included in remuneration received should be bonus payments, luncheon vouchers, an allowance for use of company's car and employer's contributions to a superannuation scheme.

Table VI.—Example of Estimating own Progress Compared with that of Others of the Same Grade

Basic Data

Profession:	Engineer
Year of survey:	1955/56 (Fiscal year)
Income:	£1500 p.a. in 1955/56
Age:	45 in 1955/56

Derived Data

Grade:	G60[1]

Age	Income in year of survey[1] (£ p.a.)	Fiscal year (T)	I_{mn} (note 2)	$\frac{I_{mn}}{I_{mr}}$ (note 3)	Income[4] in year T (£ p.a.)
(1)	(2)	(3)	(4)	(5)	(6) = (2) × (5)
45	1500	1955/56	2·55	1·00	1500
46	1540	1956/57	2·76	1·08	1600
47	1570	1957/58	2·89	1·13	1750
48	1600	1958/59	3·00	1·17	1870
49	1630	1959/60	3·07	1·20	1960

Notes

[1] From Fig. 12 for engineers (Fig. 11 for chemists).

[2] From Table VII (index of weekly wage rates). Could also be taken from Table VIII (index of average weekly earnings).

[3] 1955/56 is year of survey, i.e., is the reference year. Hence $I_{mr} = I_{mn}$ for 1955/56 = 2·55.

[4] This is how others of the same grade are estimated to progress. An income higher than that calculated indicates promotion to a higher grade, and vice versa.

Table VII.—Index of Weekly Wage-rates

Year	Index
1938	1·000
1946	1·633
1948	1·781
1949	1·828
1950	1·863
1951	2·020
1952	2·187
1953	2·289
1954	2·389
1955	2·549
1956	2·759
1957	2·892
1958	2·996
1959	3·071

Note: Based on data given in Ref..[9]

Table VIII.—Index of Average Weekly Earnings

Date	Index
1938	1·000
Oct. 1946	1·897
Apr. 1947	1·944
Oct. 1947	2·032
Oct. 1948	2·203
Oct. 1949	2·285
Apr. 1950	2·331
Oct. 1950	2·404
Apr. 1951	2.554
Oct. 1951	2·650
Apr. 1952	2·766
Oct. 1952	2·853
Apr. 1953	2·962
Oct. 1953	3·007
Apr. 1954	3·127
Oct. 1954	3·225
Apr. 1955	3·422
Oct. 1955	3·515
Apr. 1956	3·715
Apr. 1957	3·844
Apr. 1958	4·022
Apr. 1959	4·178

Note: Based on data given in Ref..[9]

The Environment

In an industrial civilization many needs arise for a large number of different products and services. These needs are satisfied by a correspondingly large number of specialized work units. This system of organization will succeed in meeting the society's needs only if all the following requirements are satisfied:

(1) The society's effort has to be divided into separate and distinct activities carried out in work units. Each work unit carries out an activity essential to the completion of the work, determined by the work undertaken. This division of work, to be effective, has to be functional.[11, 15, 17]

(2) Individuals and work units need to co-operate with each other to complete the work undertaken, that is, work together in teams for the benefit of society at large.[11, 15–17]

(3) Free competition is required between work units carrying out the same functional activity. This ensures that work is done efficiently.[11]

(4) Reward has to be in proportion to the service rendered and to the urgency of the need satisfied.

If any of these requirements is not met, then difficulties can be expected. Difficulties which occur when requirements (1), (2) or (3) are not met have been investigated and the analysis reported in the references indicated. This article deals with requirement number (4) above.

There is preoccupation amongst professional employees about salaries. It is felt that reward, in terms of salary and status, is out of proportion to the service rendered, compared with the reward given to other sections of the community for the services rendered by them. In other words, it is felt that the professional employee is losing status. To evaluate such a change so as to prove this one way or the other requires an analysis of work done by individuals, that is of service rendered. A comparison may then be made by comparing groups rendering equivalent service, or by evaluating how status changes with time. This presupposes the existence of a national scale of service and reward.

This article analyses the work and pay of the professional employee, illustrated by reference to chemists and engineers, and compares this with that of manual employees. It is shown that professional employees are in fact being paid according to a fairly rigid national scale of remuneration. It is a scale which determines reward in accordance with the responsibility carried. It, in connection with a similar scale at a different point in time, may be used to separate out how a particular individual or group has maintained his or its position within their own group or society at large, by allowing for changes due to increased or reduced responsibility.

The existence of an overall national scale of reward, which allocates reward in accordance with service rendered, raises a number of points. Reward should increase in accordance with the need satisfied, but one has to accept that it may decrease as the need diminishes. It remains to establish either that the need has changed or that internal conflict within the society interferes with the fair apportioning of reward. Should such conflict be present it would operate to the detriment of the society as a whole. As regards the professional employee, it is probable that, in a highly industrialized society, within a larger equally industrialized and competitive world, its welfare tomorrow depends on the reward, that is on status and thus on remuneration, given to its professional employees today.

The model of the economy described above draws attention to the need for teamwork between individuals or groups, reward adjusting itself freely in accordance with variations in the urgency of needs. Where this is not the case, difficulties may be expected. This article shows that it is the employers who are depressing the status of the professional employee without, undoubtedly, being aware of this, their attention remaining focused on wage-rates instead of being concentrated on earnings, or else by following a pattern of supply and demand which puts manual work at a premium. This has resulted in a reduction of incentive to carry responsibility, for the professional employee, to the extent that he must do work at an ever higher level of responsibility so as just to maintain his status, with consequent risk to the future prosperity of society at large. Again, no comment is made here on what is, or is not, a desirable status, but it is emphasized that the rate at which status is reducing is such that there is no positive reward for the professional employee for the increasing responsibility he carries as he grows older. Again we see that each single one of the requirements, given above as being basic to our industrial civilization, has to be satisfied, society as a whole being detrimentally affected when this is not so.

ACKNOWLEDGMENT

The author is indebted to MR. C. R. COLLEY, who read the manuscript and made many helpful suggestions.