

THE ADJECTIVE-VERB QUOTIENT; A CONTRIBUTION TO THE PSYCHOLOGY OF LANGUAGE*

BY DAVID P. BODER
Lewis Institute

INTRODUCTION

The present study was completed in 1927¹ but somehow the publication of it was delayed. Since then the author has devoted himself to teaching and research in rather different fields of psychology. However, the latest researches of various investigators referring to the psychological significance of the forms of linguistic expression and the frequent demand from various quarters for copies of the present work have led the writer to conclude that a publication of it, even in its original form, may be of some usefulness.

Progress, undoubtedly, has been made during the recent twelve years in psychology of language, although much less than the field would require. Students of the problem would undoubtedly have to turn to the work of Dr. J. R. Kantor, "An Objective Psychology of Grammar",² to the various monographs on the Rorschach test by Samuel Beck, and to the recent studies on thematic apperception and finger painting (personal communication of Dr. Eva R. Balken).

The work of Dr. Alfred S. Lewerenz of the Los Angeles Board of Education (*Time* magazine, October 23, 1939) if properly reported seems to come closest to the problems discussed in this article. His alleged claim of children's liking for special "color-

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¹The original study was presented to the department of psychology of the University of Chicago in 1927, in partial fulfillment of the requirements for the degree of Master of Arts in psychology. The author expresses his thanks to Dr. Harvey A. Carr, Dr. Arthur W. Kornhauser and Dr. Margaret E. Miller (Mrs. W. L. Chenery) for helpful suggestions during the course of the original investigation. He is also indebted to his wife, Dr. Dora N. Boder, for the painstaking assistance in the word count.

²Indiana University Publications, Science Series No. 1, 1936.

ful adjectives" and his attempt to rate the style of books from analysis of the occurrence of certain words including certain kind of adjectives seem to indicate that the methods of style appraisal suggested in the present article are promising of theoretical as well as practical usefulness.

THE PROBLEM AND SOME REASONS FOR ITS FORMULATION

The purpose of this study is to approach the English language, especially as it is used in the works of American writers, from the point of view of the numerical relationship between adjectives and verbs, and to survey the possibilities of a psychological interpretation of the results. This inquiry takes its rise from the investigation conducted by Busemann (1) in Germany, who studied relationships of this type in the speech of children.

Busemann recorded in shorthand a number of stories told by children of different ages on subjects such as "Christmas Celebration," "An Outing," etc., and found a marked fluctuation of the relationship between "qualitative" and "active" (dynamic) expressions. Into the category of *qualitative* descriptions, he includes not only adjectives, but also nouns and participles of verbs, when used as attributes to any other noun; into the category of *active* descriptions, he includes all verbs except the auxiliary. By dividing the number of verbs by the number of qualitative descriptions he obtains a measure which he calls the Action Quotient (Aq.) of style. It is evident that the Aq. *increases* with the relative increase in the number of verbs, and *decreases* with the relative increase of qualitative descriptions.

On the basis of data obtained with a number of children, Busemann concludes that the relative number of adjectives does not increase steadily with age, but that a rhythmical increase and decrease of the Aq. occurs, corresponding to alleged rhythmical changes of emotional stability during childhood, adolescence, and youth. The periods of high Aq., i.e., a decrease in the proportion of adjectives, appear, according to Busemann, in boys at the ages of 5, 9, 12-13, and 17-18; in girls at 9-10, 11-15 (not very distinctly), and decisively at 16-17. According to Busemann's theory, these rhythmical variations are not only peculiar to the first 18-20

years of life, but continue throughout the whole lifetime and reflect rhythmical variations of emotional stability and creative power.

The following is an example of Busemann's procedure:

A year after the first speech records were made, he had the opportunity to take a second record on twenty-six of the forty children previously tested, ranging in age from six to nine. He found that with twenty-one children the action quotient had changed to an extent which he considered significant. With some it had increased; with others, decreased. Along with this variation of the Aq. he found a corresponding change in the teacher's ratings of the same children. Some of those who had been restless and talkative were now described as more stable, and vice versa. In every case the Aq. and the teacher's rating changed in the same direction—that is, an increase in Aq.; i.e., an increase in the relative number of verbs, was accompanied by an *increase in emotional instability*. Only five children had the Aq. unchanged (three of these had a low, and two a high Aq.); and for these five the teacher's ratings also remained unchanged. According to Busemann there was a definite correspondence between these two measures.

Stern, while severely criticising Busemann's claims that a definite correlation exists between the Aq. and emotional states, finds, nevertheless, considerable merit in his work. We are particularly interested in the following two points to which Stern also calls attention:

1. Busemann has found a style difference which, when sufficiently large, possesses a "personal symptomatic character." Stern (9) writes: "Busemann is right when he speaks of an 'active' and a 'qualitative' style; he gives the interesting proof that those 'style differences' *depend very little upon the subject matter dealt with*. The 'kinaesthetic' person (Stern and Busemann use the term '*actionale*' Person) will express himself even in the description of a landscape in 'active' terms . . . ; the individual with a qualitative style will dwell even in traveling reports upon the description of more quiet impressions. The *active* style coincides more closely with motility and emotionality, with lower objectivity, less concreteness and less intellectuality. The qualitative style reflects the opposite traits. We evidently have here a distinction similar to that which

differential psychology long ago has designated as 'subjective' and 'objective' types." (Translated by D.P.B.)

2. Busemann has proved that the written language possesses a more qualitative style than the spoken language, which fact he attributes to the difference in time generally available for speech and writing.

Stern does not recognize a periodical (rhythmic) alternation of style qualities, and sets forward his own postulates, according to which the linguistic development of the individual from childhood to youth is characterized by successive phases: the substantival phase, the action phase, and the qualitative-descriptive phase.

Without going further into Busemann's work, we shall mention another study that, according to our opinion, has a direct relation to our problem, although Busemann does not trace his work back to it. We refer to Rorschach's monograph on Psychodiagnosis (5).

Rorschach, as is well known, presents to his subjects a series of ink blots some of which are printed in black, and others in one or more colors. He classifies the interpretations of these blots given by the subjects and calculates the ratio between different types of descriptions made. Rorschach emphasizes the distinction between kinaesthetic responses (verbs) and color responses (qualitatives). It appears that his *extroensive* and *introensive* types correspond in some ways to Stern's subjective and objective types; and these, according to Stern, (9), can be identified by Busemann's Aq. Rorschach writes: "the absolute numbers of B answers (movements) and Fb answers (colors) . . . give by themselves only unsatisfactory representations: *the main importance lies in their relationship.*"

Rorschach finds that the predominance of kinaesthetic descriptions indicates moderate, sluggish motility, intraversion, and little adaptability to reality, while the predominance of color descriptions reflects the excited, but alert, exact, and rapid motility, extraversion, and better adjustment to reality.¹

¹We must say that Rorschach considers the validity of this predominance for normal subjects only and within a certain range: the abundance of verbs with the *absence of colors* corresponds to psychogenic depressions, while the abundance of colors with the *absence of verbs* appears to correspond to imbecility.

Adolph Loepfe (3) reports an extensive study of one hundred twenty school children from 10½ to 12½ years with the Rorschach material. He found that these tests were of great value for the psychological exploration of children, but that the results corresponded rather with individual characteristics of the child than with either age or school rating. We see that Loepfe does not criticize the differential value of Rorschach's tests, but only the final interpretation of the results: and his comparison of Rorschach's ratings with the personality characteristics of children, as given by the teachers, constitutes some evidence in favor of Busemann's conclusions.¹

The suggestions contained in these studies of Rorschach and Busemann, especially the latter, served as a basis for the planning of the present study. Further psychological analysis of the adjective-verb relationship appears promising not only on the basis of the work of these earlier investigators, but also in view of certain permissible hypothetical considerations. Attention is called to a few of these background considerations in the following paragraphs:

1. The adjective is a name for qualities which we attribute to an object; in most cases its use in speech involves elements of analysis and evaluation.

2. The attributive adjective is a phenomenon of speech complication and economy at the same time. It increases the number of words in the sentence but reduces the number of sentences. Thus if we say: "I have an apple; it is red," we use two sentences for the idea, "I have a red apple." The economy of words and time in the latter form is evident, but it seems also that the frequent use of attributive adjectives requires of the speaker or writer the ability to handle more complex speech units, and of the listener or reader a more refined and flexible habit of speech perception.

3. The spontaneity of the adjective-noun units requires of the individual a certain creative linguistic attitude; the presence of these units in the speech of an individual seems to indicate a higher degree of ability in speech building. The adjective-noun units are less rigid than the double noun units: the expressions "schoolyard"

¹In a testimony study (Aussageversuch) published in 1918 Jon. Schrenks found that the color descriptions during childhood show "certain regular undulations" (quoted from Busemann).

or "paper napkin" are combinations of more complete and permanent character than a "large yard" or a "clean napkin." The latter represent a more complex and a more spontaneous experience, an experience which involves a greater element of judgment.

That the adjective and noun used together form psychologically a single speech unit we may infer from such English words as "grandfather," "grandmother," etc. and even more convincingly from samples taken from modern foreign languages. In German, Spanish, and Russian we have the so-called diminutive and augmentative nouns:

English	House	Little house	Big house
German	Haus	Häuschen	Grosses Haus
Spanish	Casa	Casita	Casota
Russian	Dom	Domik	Domishtsche

Logically or morphologically these English speech forms may consist of two ideas; psychologically they are a unit and *mean* one single thing.

4. The history of language seems to indicate that the placement of the adjective before the noun is a relatively new development. In Hebrew and Latin the adjective is placed regularly after the noun (twelve men, good and true) while in modern German and English the attributive adjective is invariably placed before the noun. Spanish and French place the adjective before as well as after the noun, and the older the literary sample, the less frequently is the adjective placed before the noun. This would suggest that the attributive adjective as used in the English language is a result of linguistic progress and of increase of linguistic efficiency concomitant to the extensive usage of printing and writing in modern industrialized life.

5. If it is true that the use of the attributive adjective, especially when located before the noun, corresponds to a higher type of ideational and linguistic behavior than is usually required by other speech forms, then the assumption that it may be more easily affected by factors usually considered influencing either mental or motor activity seems also justified. This problem, however, cannot be approached until we attain a more extensive knowledge about

the general fluctuations of the adjective-verb ratio and its relations to the *content of the writing*.

Thus in the present study we were interested in determining whether there exist gross differences of adjective-verb ratios corresponding to differences in subject matter of various classes of writing, a fact apparently denied, at least to a certain extent, by Busemann and especially by Stern.

PROCEDURE

The attack on our problem involved as its essential step the obtaining of simple numerical expressions of the relationship between adjectives and verbs in selected specimens from American writings. Each count was usually made from a sample of some 300 to 350 words. The passage was read, word for word, and a separate tally kept of the adjectives and the verbs encountered. A ratio was then figured from these counts.

In the word counts the following special rules were adhered to:

1. Only attributive adjectives were counted, i.e., only adjectives placed before the noun.
2. Nouns used as adjectives (*rubber tire, ginger bread*) were *not* counted.
3. Adjectives used as nouns (*the poor, the rich*) were *not* counted.
4. Quantitative and ordinal numerals and "numeral pronouns" (*next, many, and several*) were not counted, nor was the adjective *certain*, because of its indefiniteness.
5. Verbs in all forms, including infinitives and participles (except as described under point 6), were counted.
6. Participles used without nouns and preceded by an article (*the* or *a*) or by the preposition *of* were *not* counted.
7. No forms of *have* and *be* were counted, nor were *could, should, and would*.

The writer recognizes that there may be some objections to this method of counting, especially in the case of words which may be used at different times as different parts of speech, but his intentions were: (a) to separate as far as possible the qualitative ideas

from the dynamic (kinaesthetic), and (b) to formulate sufficiently rigid rules of procedure so that the counting could be done by different persons as uniformly as possible.

A few words must be said about the quotient itself. Busemann used the number of verbs as numerator, and the number of adjectives as the denominator, calling the figure obtained the "action quotient" (Aq.), which, as said before, he found to correlate with undesirable traits of instability, restlessness, etc. The present writer has inverted the procedure and has taken the adjective as numerator in order to obtain a measure which might, if Busemann is right, correlate positively with desirable traits. The quotient adopted in this work indicates the number of *adjectives per 100 verbs*, and is designated as the Adjective-verb quotient (Avq.) By speaking of the quotient in purely grammatical terms instead of behavioral (action-quotient) the writer has tried to avoid committing himself in advance to Busemann's conclusions. To summarize: the Avq. or Adjective-Verb Quotient designates the number of attributive adjectives *per hundred verbs* in a given text, e.g., an Avq. of 15 means that the number of adjectives in the text amounts to 15% of the *number of verbs*.

THE ADJECTIVE-VERB QUOTIENT IN AMERICAN WRITING

The first step was to investigate in a preliminary way how the Avq. varies: (1) in the writings of the same individual, (2) from individual to individual, and (3) from one type of writing to another. The specimens chosen consisted of widely diverse kinds of printed material, a number of typewritten theses, and a few intimate private letters—altogether 388 specimens covering approximately one hundred twenty thousand words of text. The results are summarized in Table I, and the detailed findings for each group are given in the appendix.

Although the number of specimens for each kind of writing seemed insufficient to permit one to draw definite conclusions about the Avq. for each of the classes studied, the data offered sufficient evidence that the Avq. varies significantly with the category of material from which the specimens are taken.

In order to verify the above conclusions a new series of material

was chosen and a new class of American literature, namely, modern plays, was added. We expected that the study of the latter group might throw some light upon the Avq. of the spoken language. The new material consisted of four classes: (a) modern three- or four-act plays, (b) State and Federal statutes, (c) recently published fiction, and (d) scientific monographs. The total sample material presented in the final table covers approximately one hundred sixty thousand words.

TABLE I
SUMMARY OF RESULTS OBTAINED IN THE PRELIMINARY STUDY

Sources	No. of Specimens	Avq.'s		Average
		Lowest	Highest	
Legal statutes and documents	13	0	31	15.9
Business letter forms	7	0	33	18.5
Private letters				
(inexperienced writers)	10	4	60	21.9
Fiction	20	10	80	34.8
Poetry	18	0	75	35.7
Brisbane's "Today"	15	28	72	41.9
Private letters				
(experienced writers)	39	13	100	42.7
Emerson's Journals	132	11	138	47.1
Scientific writings (except theses)	20	37	90	64.3
Masters' theses	30	10	130	64.4
Mencken in Am. Mercury	36	31	160	72.2
Advertisements	18	33	167	78.2
Ph. D. theses	30	50	200	87.7
Total	388			

THE AVQ. IN MODERN AMERICAN PLAYS

The material was chosen in the following ways: ten plays were taken from Montrose J. Moses' "Representative American Dramas," the other ten were chosen from Quinn's "Contemporary American Plays," or from Burns Mantle's "Best Plays." Most of the material was published after the World War, and only one play goes back as far as 1907.

From the first ten plays two specimens from each act and for each of the four principal roles were chosen. From the next five plays two specimens for the same number of roles were taken from the second act only; the last five plays are represented by three continuous specimens from each, not distributed by roles; these samples were taken directly from Mantle's "Best Plays," where they are presented as the culminating scenes of each drama.

In order to save time in counting the number of words of each specimen (a task quite difficult, since in the first fifteen samples the different roles were to be separated), a text containing 50 verbs was taken as a unit; it corresponds approximately to a specimen of 200-250 words. In a few cases the desired length or number of specimens was not obtainable.

TABLE II
AVQ. DISTRIBUTION OF ALL SPECIMENS FROM PLAYS

Avq.'s	No. of Specimens	%
0- 9	115	50.9
10-19	76	33.6
20-29	26	11.5
30-39	4	1.9
40-49	3	1.3
50-59	1	0.4
60-69	1	0.4
Total		226
Average Avq. = 11.2 (P.E. = .43)		
O. = 5.3; Q. = 18.6; S.D. = 9.58 (P.E. = .304)		

Table II shows the frequency distribution for the total number of specimens taken from drama. As we see, 51% have an Avq. below 10 and only 15% show an Avq. higher than 20.

The distribution of 211 role specimens classed separately by age and sex shows little difference save a slightly lower average Avq. for young women than for the other three groups (Table III).

The 15 "continuous" specimens which, as said before, were taken not by roles, but from the continuous dialogue, give approximately

TABLE III
AVQ.'S OF SPECIMENS FROM PLAYS DISTRIBUTED
BY SEX AND AGE

Avq.'s	Men				Women				Total No. of Cases	
	No. of Cases	Older %	Younger No. of Cases	%	No. of Cases	Older %	Younger No. of Cases	%		
0-9	19	43.2	25	40.3	27	47.2	35	70.0	106	50.3
10-19	16	36.4	24	40.0	19	33.3	12	24.0	71	33.2
20-29	6	13.6	9	15.0	7	12.3	3	6.0	25	11.9
30-39	1	2.3	2	3.6	1	1.7	—	—	4	1.9
40-49	1	2.3	—	—	2	3.1	—	—	3	1.4
50-59	—	—	—	—	1	1.7	—	—	1	0.5
60-69	1	2.3	—	—	—	—	—	—	1	0.5
70-79	—	—	—	—	—	—	—	—	—	—
Total	44		60		57		50		211	
Average		12.7		12.2		13.1		7.1		11.3

the same average. They seem to show that the low Avq. in plays is not the property of separate roles but of the dialogue as a whole. The analysis of the few roles with high Avq.'s indicates that they are generally found where the conversational style tends to be replaced by the narrative or descriptive style. The fantastic "soul keeper" Charles in "The Adding Machine," the scenario writer Leach in "Dulcy," the advertising agent in "It Pays to Advertise," the preacher's wife Mrs. Bumstead-Leigh in the play of the same name, are the characters which show a relatively high Avq. To summarize: the use of the attributive adjective in contemporary drama is greatly restricted.

THE AVQ. IN LEGAL WRITING

The legal material was obtained from the Illinois Revised Statutes (1923) and from the U. S. Federal Codes (1926). Two to four specimens were taken from each hundred pages; a passage containing 50 verbs served as a unit (such passages cover on the average some 300 words). Table IV shows the frequency distribution of the 110 specimens (Illinois 43, Federal 58, and nine random specimens previously studied).

As the table shows, approximately 75% of the Avq.'s from legal

TABLE IV
AVQ. DISTRIBUTION OF SPECIMENS FROM LEGAL
STATUTES

Avq.'s	Number of Specimens	%
0-9	22	20.0
10-19	47	42.7
20-29	20	18.1
30-39	7	6.4
40-49	9	8.2
50-59	3	2.7
60-69	—	—
70-79	2	1.8
Total		110
Average Avq. = 20 (P.E. = .938) ¹		
Q ₁ = 11.2; Q ₃ = 26.7; S.D. = 14.6 (P.E. = .664)		

statutes are higher than the average of the Avq.'s for modern American plays.

THE AVQ. IN FICTION

Twenty novels, ten written by men and ten by women, were chosen from the catalogue of fiction published between January, 1920, and December, 1925. The authors were recommended by the reference librarians of the Chicago Public Library and of the library of the University of Chicago, as the most popular. Three specimens of about 350 words each were taken from each book, separated from each other by approximately one-third of the number of pages in the book. Since the dialogue had already been studied in plays, we chose for the study of fiction only specimens of continuous prose, which did not include conversations.

Table V gives the frequency distribution of all fiction specimens including those of the preliminary study. As we see, there are no significant differences in relation to sex of the authors. In general the Avq.'s are far higher than in the two preceding classes of writing, i.e., drama and law; approximately 80% of fiction gave an Avq. higher than the average of the Avq.'s of legal statutes, and 96%

¹Averages and quartiles in all tables are calculated from the actual data.

TABLE V
AVQ. DISTRIBUTION OF SPECIMENS FROM FICTION

Avq.'s	Men Authors		Women Authors		Total	
	Cases	%	Cases	%	Cases	%
0-9	1	2.5	1	2.5	2	2.5
10-19	5	12.5	7	17.5	12	15.0
20-29	11	27.5	11	27.5	22	27.5
30-39	11	27.5	8	20.0	19	23.7
40-49	5	12.5	6	15.0	11	13.7
50-59	2	5.0	4	10.0	6	7.5
60-69	3	7.2	1	2.5	4	5.0
70-79	—	—	1	2.5	1	1.2
80-89	1	2.5	1	2.5	2	2.5
90-99	1	2.5	—	—	1	1.2
Total	40		40		80	
Average Avq.	35.8		34.7		35.2	(P.E. = 1.35)
Q ₁ = 23.6		Q ₁ = 21.9		Q ₁ = 23.6		
Q ₃ = 44.0		Q ₃ = 45.0		Q ₃ = 44.5		
				S.D. = 18.06		(P.E. = .963)

of the specimens of fiction have an Avq. higher than the average of the Avq.'s of specimens from American plays.

THE AVQ. IN SCIENTIFIC MATERIAL

In the preliminary study of scientific writings, we already had 30 specimens from Ph. D. theses, 14 specimens from the collection "Psychologies of 1925," 6 specimens from scientific text books, and 30 specimens from Master's theses. We now added to our material "The Nature of the World and of Man" (a book by 16 University of Chicago professors, which also contains 3 articles from the Annual Report of the Smithsonian Institution for 1925). Three specimens of approximately 350 words each were taken from each author.¹

Table VI shows the frequency distribution of the Avq.'s for all scientific material. As we see, approximately 93% of the specimens

¹For detailed results on this group, see Table XXII of the appendix.

TABLE VI
AVQ. DISTRIBUTION OF SPECIMENS FROM SCIENTIFIC WRITINGS

Avq.'s	Master's Theses		Ph. D. Theses		Monographs & Books		Total	
	Cases	%	Cases	%	Cases	%	Cases	%
0- 9	—	—	—	—	—	—	—	—
10- 19	1	3.3	—	—	—	—	1	0.7
20- 29	2	6.7	—	—	—	—	2	1.4
30- 39	4	13.4	—	—	4	5	8	5.7
40- 49	2	6.7	—	—	11	13.7	13	9.2
50- 59	4	13.4	6	20.0	18	22.5	28	19.8
60- 69	5	16.5	3	10.0	16	20.0	24	17.0
70- 79	3	10.0	6	20.0	8	10.0	17	12.0
80- 89	2	6.7	3	10.0	12	15.0	17	12.0
90- 99	4	13.4	5	16.7	2	2.5	11	7.8
100-109	—	—	2	6.7	4	5.0	—	—
110-119	2	6.7	1	3.3	—	—	6	4.3
120-129	—	—	2	6.7	1	1.2	3	2.1
130-139	1	3.3	—	—	3	3.7	3	2.1
140-149	—	—	—	—	—	—	4	2.8
150-159	—	—	—	—	—	—	—	—
160-169	—	—	1	3.3	—	—	1	0.7
170-179	—	—	—	—	—	—	—	—
180-189	—	—	—	—	—	—	—	—
190-199	—	—	—	—	—	—	—	—
200	—	—	1	3.3	1	1.2	2	1.4
Total	30		30		80		140	
Aver. Avq.	64.4		87.7		68.7		75.5 (P.E. = 1.81)	
Q ₁	= 42.5	Q ₁	= 65.0	Q ₁	= 52.8	Q ₁	= 54.3	
Q ₃	= 87.5	Q ₃	= 99.0	Q ₃	= 82.5	Q ₃	= 87.0	
S.D.							= 31.87 (P.E. = 1.28)	

of scientific writings have higher Avq.'s than the average for fiction, 98% have Avq.'s higher than the average for law, and 99% have higher Avq.'s than the average for plays.

DISCUSSION

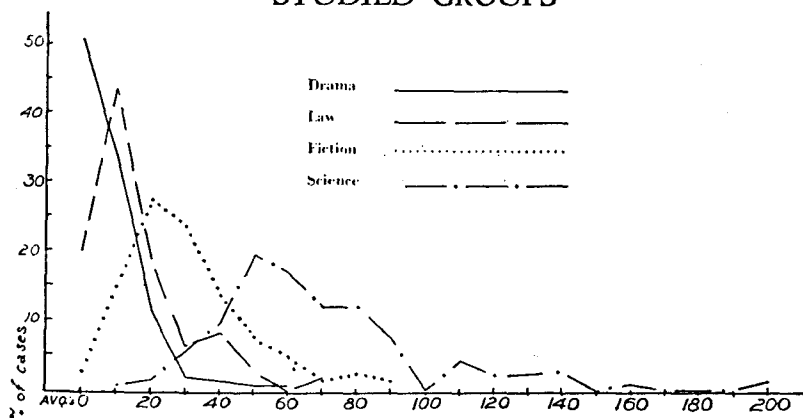
Table VII and Graph I summarize the distribution of data for the four principal groups studied. The Avq.'s vary according

TABLE VII
(DISTRIBUTION OF THE AVQ.'S OF THE FOUR GROUPS
STUDIED)

Avq.'s	Drama		Law		Fiction		Science	
	Cases	%	Cases	%	Cases	%	Cases	%
0- 9	115	50.9	22	20.0	2	2.5	—	—
10- 19	76	33.6	47	42.7	12	15.0	1	0.7
20- 29	26	11.5	20	18.1	22	27.5	2	1.4
30- 39	4	1.9	7	6.4	19	23.7	8	5.7
40- 49	3	1.3	9	8.2	11	13.7	13	9.2
50- 59	1	0.4	3	2.7	6	7.5	28	19.8
60- 69	1	0.4	—	—	4	5.0	24	17.0
70- 79			2	1.8	1	1.2	17	12.0
80- 89					2	2.5	17	12.0
90- 99					1	1.2	11	7.8
100-109							—	—
110-119							6	4.3
120-129							3	2.1
130-139							3	2.1
140-149							4	2.8
150-159							—	—
160-169							1	0.7
170-179							—	—
180-189							—	—
190-199							—	—
200							2	1.4
Total of cases	226		110		80		140	
Aver.	11.2 (P.E. = .43)		20.0 (P.E. = .938)		35.2 (P.E. = 1.35)		75.5 (P.E. = 1.81)	
Q ₁	5.3		11.2		23.6		54.3	
Q ₂	18.6		26.7		44.5		87.0	
S.D.	9.58 (P.E. = .304)		9.58 (P.E. = .304)		18.6 (P.E. = .963)		31.87 (P.E. = 1.28)	

to the purpose and content of the writing, and we may consider from this point of view that these groups present four different types of style, which may be designated as (a) the conversational (drama), (b) the normative (legal statutes), (c) the narrative (fiction), and (d) the descriptive (science). We see then that the number of adjectives per 100 verbs is least in drama, slightly more in legal

GRAPH I
DISTRIBUTION OF THE AVQ.'S OF THE FOUR
STUDIED GROUPS



material, increases significantly in fiction, and reaches its highest value in scientific writings.

The difference in Avq.'s between drama and fiction can be accounted for by reference to several factors:

1. A dialogue starts generally with a topic commonly known by the conversing parties. Under such conditions qualitative descriptions are rarely made; in cases when adjectives occur they are used mainly in the form of judgments, i.e., in the predicative rather than in the attributive form.

2. The intonation and gesticulations of the speaker revealing his attitudes toward things and people may replace a considerable number of adjectives.

3. The substitution of personal pronouns (I, you, he, she, they) for nouns which occur more frequently in the dialogue than in any other form of writings, reduces significantly the number of nouns in the text, and consequently reduces the opportunity for using the attributive adjective.

4. The situation in fiction is entirely different from that in drama. The writer is supposed to inform the reader about persons and situations; he has to present them to the reader exclusively in words since he lacks the material scenery of the theatre or the abundant pictorial illustrations of the old-time novel or the present-day

magazine. The time element involved in the actual process of speech and writing is usually different and contributes to the reduction of the number of adjectives in the dialogue for the sake of brevity. This has been recognized also by Busemann and Stern. The time of writing is under the author's control; so that he can pay more attention to the style and choose the proper expressions. He has the possibility of rereading his material and inserting adjectives where found necessary, thus converting his material into a product of repeated and premeditated activity, lacking the spontaneity and speed which characterize the dialogue. The problem of space saving in written language may also suggest the use of the adjective in the attributive form rather than in the predicative, since the former, as we have pointed out before, is the more economical.

5. So much for speech production. What about the conditions of speech perception and understanding?

The attributive adjective, as was said before, enriches the content of the passage and at the same time reduces the total number of words. The expression, "a red apple fell from the tree," stands for two sentences: "An apple fell from the tree. It was a red one." The former expression gives not only more concepts in fewer words but cuts out the repetition of the noun or the use of a substituting pronoun. So while the stimulus becomes more complicated, the time and span of perception are reduced. It would not be altogether erroneous to assume that the ordinary theater public which come to *see a show* would not sit through a play that requires extraordinary effort in following an elaborate style of language ("Strange Interlude" and the unabridged "Hamlet" are definite exceptions).

Not so in fiction. The reading time is under control of the reader. We may slow down at the more elaborated passages without *rereading* them. The condensed language, rich in descriptive terms, may stimulate meditation and fancy in a way that gives some people no less satisfaction than the content of the story itself. But since the average fiction reader searches for the *story*, the acts rather than the qualities remain the predominant items of the text.

6. There is also another factor in fiction, as well as in plays, that reduces the number of attributive adjectives in both of them in comparison with science. In fiction and plays, the personal

pronoun is used quite frequently; and likewise frequent use is made of the proper name (Helen, Henry, etc.) which stands for the individual with all his previously given characteristics; the use of the adjective in conjunction with a proper name (little Jimmy, old Joe, etc.) is, where style is concerned, a definite exception. In this respect it must be observed that science, except mathematics and chemistry, appears to be somewhat slow in coining new nouns for newly discovered objects and phenomena, and there is a tendency to preserve the combined descriptive terminology such as "positive protons," "negative electrons," rather than to invent names that would designate the phenomenon in one conventional word. In this respect, science is quite different from industry, which rather frequently adopts almost meaningless words to name objects ("Camels" for cigarettes, "Lux" for soap, etc.) with the purpose of finding for the product a name (trade mark) that will be easily read and remembered. In applied technology and in industry, where terms have to be frequently used in speech with the general public and with the worker, we notice the tendency to shorten the nomenclature; the adjective and the noun are consolidated in code words and abbreviations: the "C. P. R." for Canadian Pacific Railroad, the "A. & P. Stores" for Atlantic and Pacific Stores, and "D. C." for "direct current" are but a few illustrations. During the World War, the code words designated mainly as telegraph addresses for different commanding units were very soon adapted in the spoken language to designate the same units. In our opinion these facts corroborate the conclusion suggested by the low Avq. in plays: every-day language, contrary to scientific style, tends to reduce significantly the number of adjectives used, probably in the interest of both the speaker and the hearer.¹

The differences between the Avq.'s of legal statutes and scientific material may be attributed to a certain extent to the following facts: statutes deal mainly with acts of human beings; they

¹This was written in 1927. The subsequent epidemic of alphabetic connotations confirms the soundness of this statement. At the same time it indicates, as Donald Richberg pointed out some years ago, that the use of alphabetic connotations was practiced by industry long before the advent of the New Deal, which is so often blamed for its "alphabetic" terminology.

restrict to a certain extent the freedom of action and intend to prescribe as precisely as possible certain ways of conduct of citizens and of governmental agents. They deal strictly with specified acts. We rarely find in statutes discussions with reference to causes of a certain legal enactment, and when the title does deal with such aspects, they are given in the statement of purpose: "Act to regulate the manufacture, use, and sale of cigarettes . . .," "Act to prohibit . . . purchasing . . . of goods from minors" etc.

On the other hand, scientific writings seem to deal with the mutual relations of men, animals, and things as consequences of their more or less constant qualities. Science escapes as far as possible the use of metaphorical speech forms; this is achieved to a certain extent by converting the verbs into nouns and adjectives (not participles), viz: "*Food absorbable* by gut wall," etc. This also may be illustrated by juxtaposition of the technological term, "*motion pictures*," and the commonly used expressions "moving pictures" or "movies."

It seems that the precision achieved by legal statutes mainly through the verb is accomplished in science to a large extent through the adjective.

SUMMARY OF RESULTS

1. The distribution of the Avq.'s for each of the kinds of writings studied, i.e., plays, legal statutes, fiction, and scientific monographs, shows sufficiently large differences to prove that as a rule the Avq. varies with the subject matter of the text.

The figures for each of the groups studied are as follows:

	Q_1	Q_3	Average	Diff.	Sigma Diff.
1) Plays	5.3	18.6	11.2		
2) Legal Stat.	11.2	26.7	20.0	8.8	1.531
3) Fiction	23.6	44.5	35.2	15.2	2.452
4) Science	54.5	87.0	75.4	40.2	3.366
Other differences:					
Between plays and fiction				24.0	2.117
Between plays and science				64.2	2.768
Between legal statutes and science				55.4	3.032

2. The low Avq. in the spoken English as presented by modern American plays coincides with Busemann's findings for the Ger-

man spoken language. It suggests that the necessity of fast and spontaneous verbal reactions during the dialogue reduces the number of adjectives.¹

3. The low Avq. of legal writings compared with the high Avq. in scientific monographs suggests the following interpretations: (a) law deals mainly with human beings and their acts while science deals with objects and their relatively permanent properties; (b) the act is more easily identified and defined than the quality; (c) the scientific monograph in its modern form is from an historical point of view the newest type of writing and is designated for a trained reader and thinker. Scientific presentation generally does not consider the amount of effort and time required from the reader (and the hearer).

4. Since the use of the attributive adjectives depends upon the writer, we may consider that the Avq.'s found for plays and fiction correspond to a certain extent to the taste of the contemporary theater audience and the reading public respectively. The large difference between the Avq.'s of these two classes of literature may depend to a certain extent upon the difference in efficiency of understanding of heard and read material. The speed limit for the understanding of spoken language is lower than the speed limit for speaking itself (especially when produced by trained speakers such as the actor). On the other hand, the reading time is under our control, and we are not only able to understand a more elaborate language, but at times derive a certain pleasure from the application of the effort involved in the comprehension of a stylistically more elaborate text.

APPENDIX

AVQ.S IN SPECIMENS FROM EMERSON'S JOURNALS

For an exploration of the possible range of fluctuations of Avq.'s of an individual writer, Ralph Waldo Emerson's Journals, kept by the author for a period of more than 50 years with the exact date of each entry, seemed to offer the best material for the purpose. Emer-

¹This fits in with Miss Loring's (4) findings that in controlled association experiments the reaction time for adjectives is longer than for nouns or verbs.

TABLE VIII
AVQ.'S OF 108 SPECIMENS FROM EMERSON'S JOURNALS

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Aver.	Age
1820	68	40	73	48	42	58	39	57	26	61	73	50	52.9	16
1825	32	72	138	34	58	63	37	61	54	41	71	33	57.8	21
1830	23	24	44	38	34	35	34	48	22	32	44	21	33.2	26
1835	51	41	58	71	43	35	35	26	30	29	74	37	44.2	31
1840	23	33	19	34	36	45	31	68	65	37	17	22	35.8	36
1845	44	36	22	28	25	34	21	107	43	7	41	70	45.3	41
1850	26	29	27	25	43	30	70	57	24	110	74	39	46.2	46
1855	17	24	41	26	20	22	16	33	54	37	20	40	27.5	51
1860	11	60	10	35	70	16	50	45	37	22	66	26	36.6	56
1865	40	69	30	40	76	23	45	57	20	55	35	33	41.9	61
1870	41	24	64	33	15	37	41	30	42	62	23	26	36.5	66
Aver.	34.2	41.1	47.8	37.4	42.0	36.2	38.1	52.0	36.1	50.8	48.9	36.1	—	—

son's Journals begin in 1820 and continue to the end of his life in 1876, but after 1870 the material becomes irregular and the entries are frequently too short to be used. A specimen of approximately 350 words was taken for each month of the year 1820, and for every fifth year following. If for the given year a certain month was omitted or the specimens were shorter than 200 words, the specimen was chosen from the nearest following or preceding year which offered available material. Tables VIII and IX, and Graph II present the results. Q_1 and the mode are almost identical with the data for American fiction, while Q_3 is somewhat higher but reaches only Q_1 for scientific material. In other words, about 75% of samples from Emerson's Journals do not exceed in the proportional use of adjectives the lowest 25% of samples taken from scientific material.

We are not ready to say how the rises and falls in the curve are to be interpreted. It may well be that they do reflect changes due to age and other physiological and psychological conditions. However, a further biographical and statistical study would be required before we could decide to attribute these fluctuations to periodic changes in emotional stability, as Busemann's work would suggest.

TABLE IX
FREQUENCY DISTRIBUTION OF THE DATA FROM
TABLE VIII

Avq.'s	No. of Cases	%
0-9	0	0
10-19	8	5.5
20-29	30	23.1
30-39	35	25.9
40-49	23	16.7
50-59	10	8.3
60-69	11	7.4
70-79	12	10.0
80-89	—	—
90-99	—	—
100	3	2.7
Total		132
Average Avq. = 47.1		

TABLE X

AVQ.'S FOR SPECIMENS FROM LEGAL STATUTES,
AFFIDAVITS, AND AGREEMENTS USED IN
THE PRELIMINARY STUDY

Source	Avq.
U. S. 66th Cong. V. 41, p. 434 (Homestead)	21
U. S. 66th Cong. V. 41, p. 1033 (Penalties)	18
U. S. 66th Cong. V. 41, p. 1195 (Corporation)	25
Naturalization Law	27
Order of Presidential Succession	0
Chicago Municipal Code, Art. 21, p. 610	11
Illinois State Charter 38, No. 749-51 (Penalty)	18
Illinois State Charter 38, No. 492 (Stolen Prop.)	8
U. S. Stat. V. 31, Treaty with Switzerland	31
Business Agreement	4
Business Agreement	18
Business Agreement	10
Business Agreement	16

TABLE XI

AVQ.'S FROM BUSINESS LETTER FORMS (53 TO 100
WORDS EACH)

Letter Form	Avq.
Trust Co.	33
Trust Co.	0
Cashier, U. of C. No. 1	11
Cashier, U. of C. No. 2	14
Cashier, U. of C. No. 3	29
Cashier, U. of C. No. 5	8
Cashier, U. of C. No. 5a	33

GRAPH II

AVERAGE AVQ.'S FOR SPECIMENS FROM EMERSON'S "JOURNALS" DISTRIBUTED BY YEARS FROM WHICH THE MATERIAL WAS TAKEN

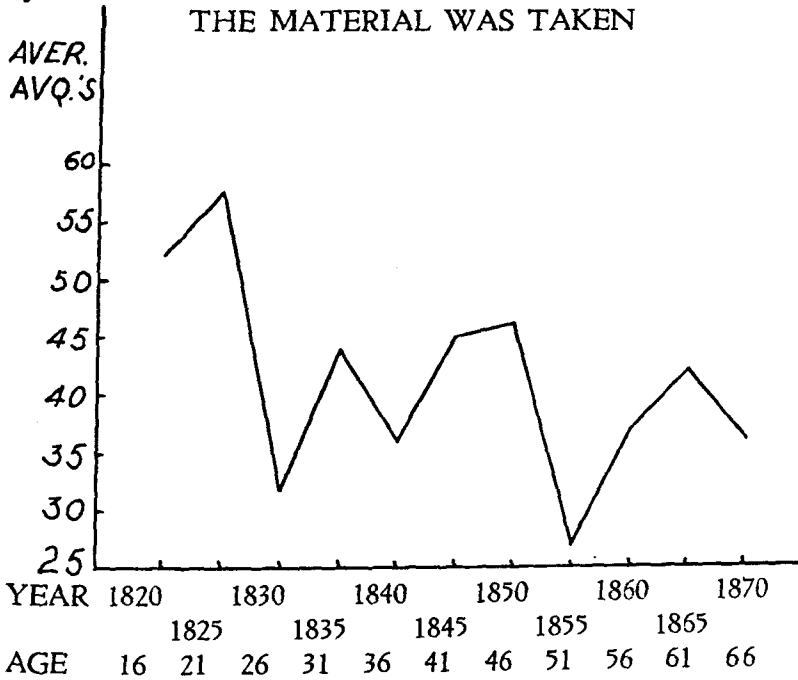


TABLE XII

AVQ.'S FROM MODERN AMERICAN POETRY

Avq.'s	No. of Poems
0	3
1- 9	—
10-19	2
20-29	3
30-39	2
40-49	1
50-59	2
60-69	2
70-79	1
80-89	—
90	—
Total	16

TABLE XIII
 AVQ.'S FROM PRIVATE LETTERS (INEXPERIENCED
 WRITERS)¹

Letter from:	Avg.
Young woman	4
" "	17
" "	20
" "	19
" "	16
Young Man	17
" "	17
" "	24
" "	25
" "	60

¹All written to the same person, a young woman: Specimens from 46 to 2025 words.

TABLE XIV
 AVQ.'S OF 20 SPECIMENS OF FICTION FROM THE
 PRELIMINARY STUDY. THE AUTHORS ARE
 10 MEN & 10 WOMEN

Avq.'s	Novels	Short Stories	Total
0-9	—	—	—
10-19	—	4	4
20-29	3	2	5
30-39	4	1	5
40-49	2	—	2
50-59	1	2	3
60-69	—	—	—
70-79	—	—	—
80-89	—	1	1
Total	10	10	20
Average Avq.	36.4	32.2	34.3

TABLE XV

SPECIMENS FROM
"PSYCHOLOGIES OF 1925"

Avq.'s	No. of Spec.
30-39	2
40-49	2
50-59	7
60-69	1
70-79	1
80-89	—
90-99	1
Total	14

TABLE XVI

AVQ.'S OF SPECIMENS FROM
6 SCIENTIFIC TEXT BOOKS

Science	No. of Cases	Avq.'s
Sociology	1	50
Economy	1	86
Physics	1	79
Biology	1	65
Histology	1	59
Technology	1	47
Total	6	Aver. 64.3

AVQ.'S FROM MENCKEN'S AND BRISBANE'S ARTICLES

Thirty-six specimens, approximately 300 words each, were taken from Mencken's articles in the *American Mercury*, written under the title, "The Library," covering 3 years, from January 1924 to December 1926. The results are shown in Tables XVII and XVIII.

There seems no doubt that Mencken's articles were designated for a more exclusive reader than were Brisbane's in his column, "Today." Comparing the frequency distributions and ranges in Tables XVIII and XIX, we find that the Avq.'s of 15 of Brisbane's columns coincide with those found for fiction, while the data for Mencken correspond with the Avq.'s of the scientific group.

TABLE XVII
AVQ'S FROM MENCKEN'S ARTICLES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average
1924	110	70	31	93	73	112	46	68	36	62	62	53	68.0
1925	43	70	130	35	73	70	73	71	76	96	39	85	71.7
1926	66	68	84	70	160	81	57	73	83	66	41	73	76.8
Aver.	73.0	69.3	81.7	66.0	102.0	87.7	58.7	70.7	65.0	74.7	47.3	70.3	72.9

TABLE XVIII

FREQUENCY DISTRIBUTION
OF THE DATA FROM TABLE
XVII (MENCKEN)

Avq.'s	No. of Specimens	%
0- 9	—	—
10- 19	—	—
20- 29	—	—
30- 39	4	11.1
40- 49	3	8.3
50- 59	2	5.5
60- 69	6	16.7
70- 79	11	30.5
80- 89	4	11.1
90- 99	2	5.5
100-109	—	—
110-119	2	5.5
120-129	—	—
130-139	1	2.8
140-149	—	—
150-159	—	—
160-169	1	2.8
Total	36	

TABLE XIX

AVQ.'S FROM BRISBANE'S
ARTICLES

Avq.'s	No. of Specimens	%
0- 9	—	
10-19	—	
20-29	1	6.7
30-39	6	40.0
40-49	3	20.0
50-59	3	20.0
60-69	—	
70-79	2	13.3
80	—	
Total	15	

TABLE XX
FREQUENCY DISTRIBUTION OF AVQ'S OF 60 STUDENT THESES

Avq.	Ph. D.			M. A.			Psychology			M. S.			Natural Science			Ps. & Sc.		
	Mn	W/n	Tot.	Mn	W/n	Tot.	Mn	W/n	Tot.	Mn	W/n	Tot.	Mn	W/n	Tot.	Mn	W/n	Tot.
10-14	—	—	1	—	—	1	—	—	1	—	—	—	—	—	1	—	—	1
15-19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
20-24	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
25-29	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
30-34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
35-39	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
40-44	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
45-49	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
50-54	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
55-59	2	1	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
60-64	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
65-69	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
70-74	1	1	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
75-79	—	3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
80-84	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
85-89	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
90-94	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
95-99	1	1	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
100-04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
105-09	1	1	2	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
110-14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
115-19	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
120-24	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
125-29	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
130-34	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
135	1	—	1	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	10	10	20	10	10	20	20	40	5	5	10	5	5	10	10	20	30	60

TABLE XXI
DATA OF TABLE XX CONDENSED

Avq.'s	Masters' Thesis	Ph. D. Thesis	Total
0- 9	—	—	—
10- 34	6	—	6
35- 54	6	2	8
55- 94	15	19	34
95-119	2	5	7
120	1	4	5
Total	30	30	60

TABLE XXII
AVQ.'S OF 60 SPECIMENS TAKEN FROM 20 SCIENTIFIC
MONOGRAPHS

No.	Specimen 1 Avq.'s	Specimen 2 Avq.'s	Specimen 3 Avq.'s
1	60	36	77
2	85	85	63
3	80	80	56
4	53	67	49
5	87	100	71
6	78	100	125
7	93	69	87
8	133	136	100
9	65	84	55
10	71	40	200
11	50	63	43
12	48	40	60
13	62	59	80
14	66	50	100
15	59	68	71
16	87	78	89
17	45	42	62
18	60	33	45
19	81	51	51
20	60	66	54

TABLE XXIII
AVQ.'S FOR LETTERS OF WILLIAM JAMES

Men	Written to		Date	Age	Avq.'s	
	Women				to Men	to Women
H. J.	—		July 11, 1888	46	44	—
—	Gr. N.		Aug. 12, 1888	46	—	58
W. D. H.	—		June 12, 1891	49	52	—
—	F. W.		June 20, 1891	49	—	75
—	G. A.		Aug. 25, 1891	49	—	62
H. J.	—		Aug. 2, 1891	49	40	—
—	B. A.		July 13, 1892	50	—	56
Th. F.	—		Sept. 19, 1892	50	37	—
H. G. W.	—		Sept. 11, 1906	64	50	—
—	Th. S.		Sept. 13, 1906	64	—	45
D. S. M.	—		Aug. 5, 1906	65	30	—
—	P. G.		Sept. 14, 1906	65	—	35
Ch. N.	—		July 6, 1908	66	60	—
—	P. G.		July 2, 1908	66	—	52
T. F.	—		June 18, 1909	67	83	—
—	Th. S.		July 12, 1909	67	—	29
—	F. M.		Mar. 29, 1910	68	—	50
T. P.	—		May 22, 1910	68	85	—

TABLE XXIV
SUMMARY OF TABLE XXIII
(JAMES' LETTERS)

Years	Average Avq.		Total
	To Men	To Women	
1882-92	43.2	62.7	52.9
1906-10	61.5	42.2	51.8
Total	53.4	51.3	52.4

Note that the Avq.'s in letters to men and women show a perfect reversal when letters written at the age of about 40 are compared with those written at the age past 65.

TABLE XXV
AVQ.'S FOR LETTERS OF JAMES GIBBON HUNEKER

Written to Men	Women	Date	Avq.'s	
			To Men	To Women
E. P. M.	—	Nov. 12, 1912	34	—
—	Fr. Ash.	Dec. 19, 1912	—	100
Ch. J. R.	—	Mar. 12, 1913	20	—
—	Ch. D.	Sept. 7, 1913	—	39
Jo. Q.	—	Mar. 9, 1914	31	—
—	Ch. D.	Nov. 16, 1914	—	52
—	Fr. Ash.	Apr. 10, 1918	—	36
Jo. Q.	—	Apr. 21, 1918	30	—
—	Fr. Ash.	June 16, 1918	—	92
—	Fr. Ash.	Aug. 11, 1918	—	32
Jo. Q.	—	Aug. 25, 1918	21	—
Al. M.	—	Sept. 4, 1918	19	—
R. Ba.	—	Nov. 21, 1918	13	—
—	Fr. Ash.	Dec. 28, 1918	—	67
—	Fr. Ash.	Aug. 1, 1919	—	45
B. D. C.	—	Sept. 27, 1919	34	—
M. Sp.	—	June 16, 1919	38	—
—	Fr. Ash.	June 20, 1919	—	20
Al. M.	—	Sept. 19, 1919	32	—
—	Fr. Ash.	Sept. 22, 1919	—	42
Dr. W.	—	Sept. 29, 1919	24	—

TABLE XXVI
SUMMARY OF TABLE XXV'
(HUNEKER'S LETTERS)

Average Avq. to Men	24.9
" " to Women	52.5
" " total	39.1

TABLE XXVII

AVQ.'S FROM 18 COMPLETE 1 OR 2-PAGE ADVERTISEMENTS
FROM A COPY OF THE SATURDAY EVENING POST

Avq.'s	No. of Ads.
0- 24	—
25- 49	3
50- 74	6
75- 99	4
100-124	2
125-149	1
150	2
Total	18

TABLE XXVIII

AVQ.'S OF 60 SPECIMENS FROM 20 MODERN AMERICAN
NOVELS

Author's Sex	No.	Spec. 1 Avq.'s	Spec. 2 Avq.'s	Spec. 3 Avq.'s
Male	1	29	27	25
"	2	48	37	51
"	3	45	24	65
"	4	28	60	26
"	5	41	36	37
"	6	42	33	60
"	7	12	27	8
"	8	92	35	20
"	9	13	18	10
"	10	26	36	37
Female	1	55	41	26
"	2	52	23	30
"	3	17	36	41
"	4	45	7	10
"	5	76	27	28
"	6	47	35	37
"	7	17	63	45
"	8	33	41	29
"	9	21	36	29
"	10	87	39	28

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