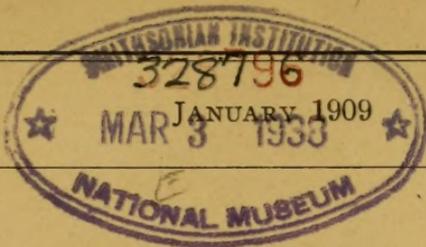




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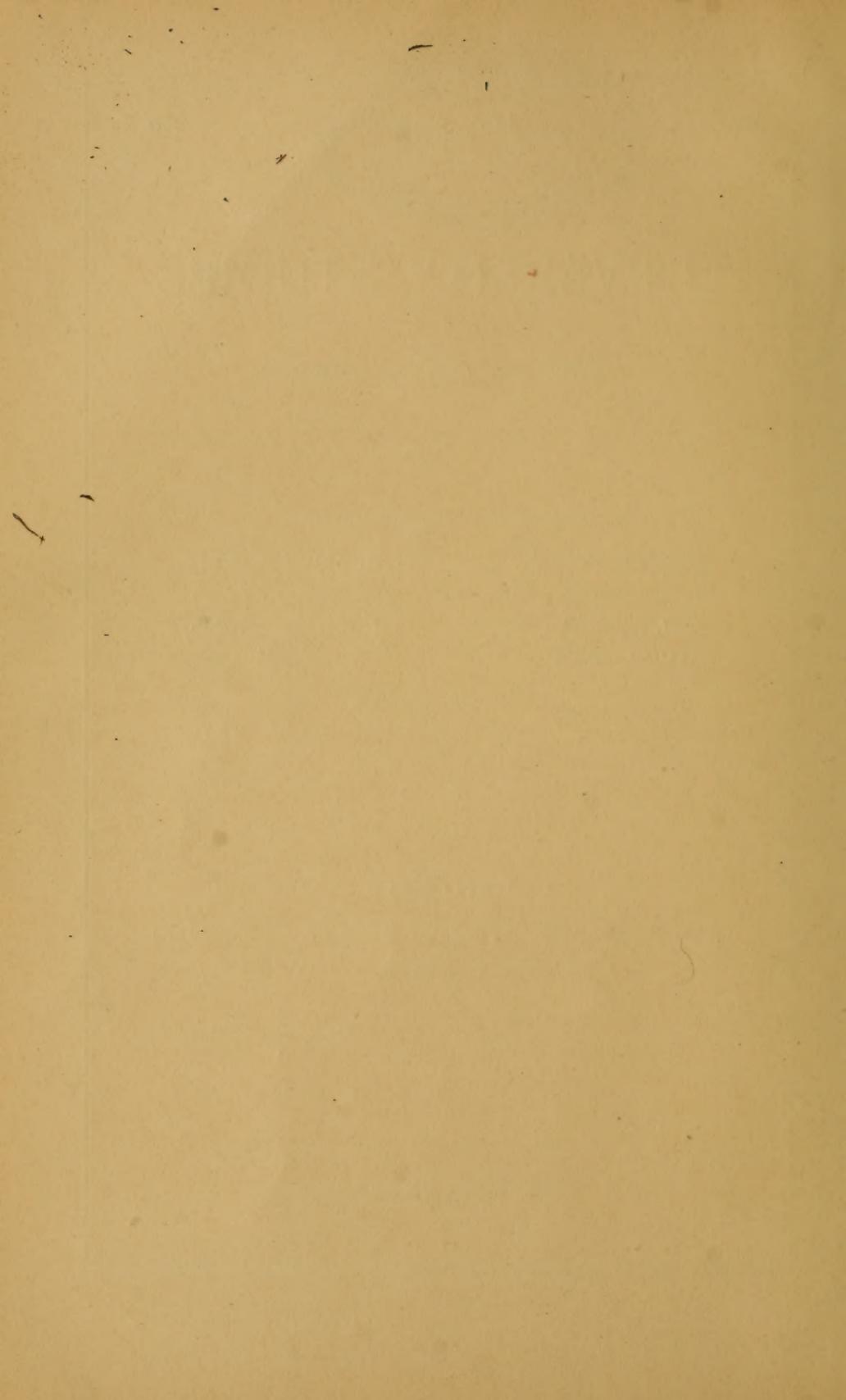
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LINCOLN NEBRASKA



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UNIVERSITY STUDIES

VOL. IX

JANUARY 1909

No. 1

The First Revolutionary Step (June 17, 1789)

BY CARL CHRISTOPHELMEIER

I

The success or failure of the reforms anticipated from the meeting of the states general depended primarily upon the solution of two fundamental questions, namely, representation and organization. The sum total of opinions as to their settlement was as broad and as deep in content as was the volume of the revolutionary spirit itself, and the extremes of opinion differed widely. A large majority of the nobles, including the superior clergy, demanded that each order should be given what seemed to them the constitutional one-third representation, while the demands of the *tiers-état* ranged from representation proportionate to the relative population of the three estates—which would have entitled the *tiers-état* to at least ninety-six out of every hundred deputies—to a representation equal to one-half of all the delegates to the states general. The king in his council (December 27, 1788) decided that the third estate should be given a representation equal in number to the combined representation of the clergy and of the nobility. This decision, although most unsatisfactory to large circles of individuals of each of the three orders, was, nevertheless, accepted with a sufficient measure of grace. The solution was truly a great victory for the *tiers-état* provided the states general should constitute itself as a single assembly.

Thus, although the question of representation was settled, another question of equal magnitude remained to be solved, namely, how the states general should organize itself. The work of the national assembly depended wholly upon its solution, for if the deputies of the three orders should meet in three separate halls the privileged classes could allow just such reforms as they wished; but if, on the other hand, all the deputies should meet in one assembly and vote by head, the *tiers-état* could control the action of the assembly. The question of organization was thus a vital one, for the fate of the states general and of the constitution and, therefore, the fate of France depended upon its treatment.

It was, according to Rabaut de Saint-Etienne, on the evening of May 5, the very day of the opening session, that "the deputies of the commons, having assembled by provinces, agreed that they would hold their sessions in the hall of the states general, that they would consider this hall as the national hall, that they would there await the other orders for the purpose of deliberating in common, and that they would not swerve from this line of conduct."¹ They did, in fact, adhere to this policy until the deputies of the other two orders joined them.

The states general was formally opened on May 5 at Versailles in the *Salle des Menus Plaisirs*. We are concerned with this stately and truly royal session only in so far as it touched the solution of the question of vote by head or by order. The king did not speak of the matter of organization at all. His anxiety in regard to it is seen, however, in his appeal to the deputies to work in harmony. Barentin, the keeper of the seals, announced that the deputies were to meet the next day and verify their credentials as promptly as possible, while Necker, in a brief reference to the subject, seemed to favor three assemblies. The great problem was left for solution, therefore, to the deputies of the three orders themselves. The hope or fear on their part that the king might decide this all-important question, or at least compromise it by showing his preference either in favor of the *tiers-état* or of the privileged aristocracy, was dispelled.

¹Rabaut de Saint-Etienne, *Précis*, 117.

When the deputies of the *tiers-état* assembled on the morning of May 6, they learned that the deputies of the clergy and of the nobles were meeting in separate halls and were even preparing for the verification of their credentials and for organization as separate orders. The assembly was in great confusion and disorder, for it did not know how to begin its deliberations. And this most embarrassing situation was made all the more difficult by the fact that some deputies, who managed to make themselves heard, wanted the assembly to remain idle and take no step toward organization. They wished the deputies of the *tiers-état* to act, not as an assembly at all, but as individuals, a group of men, "a club of friends," who were waiting for the absent deputies in order to form themselves into an active assembly. But some other deputies demanded the immediate organization of the deputies of the *tiers-état* as a national assembly; while others, more conservative, urged that before resorting to such an extreme expedient all amicable and conciliatory means should first be exhausted.

In these debates of the first day, we notice all the elements of the policy which the *tiers-état* followed up to June 17 when it constituted itself the national assembly. When the deputies had separated after this first day's session, Gaultier de Biauzat wrote to his constituents: "If my opinion becomes general, we shall notify the clergy and the nobility tomorrow that the *tiers-état* is complete, and urge them to present themselves in the hall of the commons."¹ He thought that any further action on the part of the *tiers-état* would depend upon the response which the clergy and the nobles should make to the invitation; that a final invitation would be sent, however, in case the orders should persist in separation, and that subsequently those deputies who should be present in the general hall should proceed as the states general of the nation. The same and similar views are repeatedly expressed by the deputies previous to June 10, when this policy of a last invitation and of the organization of the assembly of the commons began to be actually carried out. But up to that time

¹ Gaultier de Biauzat, II, 31-37.

the deputies of the *tiers-état* succeeded remarkably well in their policy of inactivity.

While the commons avoided every appearance of organization, they did, for temporary convenience, namely for the purpose of intelligent deliberation, allow the senior deputy to act as presiding officer and several other members, those just beneath him in age, to assist him in his functions. This policy of inactivity was the very best course for the assembly to follow, for the deputies of the *tiers-état* were not yet ready to take the decisive step of constituting themselves which they later took. It was essential for the members to move slowly until an *esprit de corps* had been developed. The deputies became in time better acquainted with each other and with each other's wishes and demands. They learned the demands and weaknesses of the other orders and the aimlessness of the government, and they were encouraged and emboldened by the feeling of the solidarity of their own interests and by the moral support which they constantly received both within and without the assembly.¹ The public associated itself with the discussions of the deputies assembled in the general hall which was usually filled to overflowing with spectators. The applause or hisses of over two thousand men and women helped, at times, to excite the assembly to fever heat. Reports of the deliberations were sent to Paris and to the provinces. Everywhere men gathered in groups to discuss the problems before the states general. The strength of the third estate grew daily, while that of the privileged orders decreased as steadily.

After a first unsuccessful attempt on the part of some of the deputies of the *tiers-état* to constitute their body as an active assembly, another, more earnest and much more systematic effort to organize was made on May 14. Learning that the deputies of the *tiers-état* were opposing verification of credentials by orders and waiting for the deputies of the clergy and of the nobles to join them and verify the credentials in common, the clergy had suspended verification of their credentials on May 7. Moved by

¹Gaultier de Biauzat, II, 32, 52. *La révolution française*, XXIII, 357, 362, 471.

an invitation received on that day from the commons, they began to consider plans that might conciliate the three orders, or at least enable the clergy to withdraw from the struggle between the orders and thus assume a neutral attitude.¹ As the deputies of the privileged orders refused to assemble in one chamber in order to consider the question of organization, the only way in which the matter could be discussed was through conferences of commissioners appointed by each of the three orders. The clergy, after debate, decided to elect such commissioners and invited the nobles and the *tiers-état* to do the same. This action was extremely wise on the part of the clergy, especially on the part of the higher clergy, who, while remaining neutral, could thus control a majority which sympathized with the interests of the third estate. And was it not in keeping with the self-chosen mission of the church to preach peace and harmony? In the meantime, the clergy could remain inactive and need not take either side. It did not compromise its position towards either order; it put itself in a most favorable light with the outside world; and, in the end, it could join the winning side without any loss of prestige which might result from the controversy. When the nobles resumed their session on May 11 the deputation of the clergy presented its plan. After careful consideration they decided, on May 12, to comply and elect commissioners. The following day they sent a deputation to the other two orders to announce their decision. The Duc de Praslin as spokesman said to the commons that he would read the resolutions passed by the *order of the nobility* which would show them its desire to maintain the fraternal union. A resolution of May 6 stated that the president and the twelve senior members were appointed as a committee on credentials, another of May 11 that those deputies whose credentials were verified without being contested were constituted as "the chamber of the nobility," and a third of May 12 that it accepted the proposition of the clergy and would name commissioners to meet the com-

¹ *Récit*, 15-17, 18-19; *Etats-généraux*, 19-21; Biauzat, II, 59-60; *Courrier de Provence*, Lettre I.

missioners of the other two orders.¹ This information caused a fiery discussion among the commons which ended only on May 18. Immediately after the deputation had left the hall, attention was called to the gross inconsistencies on the part of the nobles; it was asked of what earthly use it was to adopt the plan of appointing conciliatory commissioners when the nobles had already definitely constituted themselves as a separate and independent order. And how revolting were the words of the Duc de Praslin when he spoke of the desire of the nobles for fraternal union, when they had shown, by their very action of constituting themselves, just the opposite desire. The debate was interrupted by the arrival of a deputation of the clergy, which again presented the plan of May 7, giving as an explanation for this repetition that on the former day the *tiers-état* had requested the proposition in writing.² On May 7 the commons had neither accepted nor rejected the proposition of the clergy. But since the nobility had now accepted it, the situation had changed. It was at this time most essential for the deputies of the *tiers-état* to maintain the full confidence of their constituents and also not openly to offend or defy the privileged classes, including the king and the court. They could not afford to appear arbitrary and irreconcilable in the eyes of the people. When the question whether commissioners should be elected or not came up in the commons on May 14, Rabaut de Saint-Etienne proposed that sixteen deputies be selected to meet with the commissioners of the clergy and of the nobility to hear their propositions; that the commissioners should occupy themselves, however, only with plans favorable to the union of all the deputies of the states general. "The commissioners elected must never abandon the principle of vote by head and of the indivisibility of the states general."³

¹*Récit*, 15-17; *Etats-généraux*, 20, 28-29, 30-31; Duquesnoy, I, 14; Biauzat, II, 36, 59-60; *Courrier de Provence*, *Lettre* III, 2-4.

²*Récit*, 17-19; *Courrier de Provence*, *Lettre* III, 2, 4-5; Biauzat, II, 56; Duquesnoy, I, 17-19. The lofty and haughty manner in which the Duc de Praslin read the decrees of his order offended the commons even more than the decrees themselves.

³The *Etats-généraux*, 31-33, and the *Journal des états-généraux*, I, 23-27,

The motion was conservative. Le Chapelier immediately proposed more radical action.¹ He said that the nobles had shown that they would not join the commons, and a compromise between vote by person and vote by order was impossible. He proposed, therefore, that "the deputies of the commons of France declare that they recognize for legal representatives only those whose credentials shall have been examined by commissioners named in the general assembly by all those who have been called to compose it, because it pertains to the 'corps de la nation' as well as to the 'corps privilégiés' to know and to decide upon the validity of the credentials of the deputies who present themselves; every deputy is a member of the general assembly and can therefore receive from it alone the sanction which constitutes him a member of the states general. And since public opinion is the first and chief care of the national assembly, and since it can only be established by common deliberation, the deputies of the commons can not allow that, by some special resolution of chambers which remain isolated, the principle is assailed that each deputy is, after the opening of the states general, no longer the deputy of an order, but that all deputies alike are the representatives of

put the motions and speeches of Rabaut de Saint-Etienne and of Le Chapelier on May 13 by mistake. The commons did on May 13 begin to discuss the mission of the nobles and got quite wrought up about it; the deputation of the clergy ended the debate on that day, however, for, immediately after it had left, the session was adjourned to nine o'clock the following day. Perhaps the commons felt that this postponement of the discussion was advantageous. All the other sources set the time for the motions on May 14. Both Duquesnoy (I, 17-19) and Biauzat (II, 50-57), writing the evening of May 13, fail to mention the motions when they speak of the deputation of the clergy and of the nobility. And both, writing again on May 15 (I, 19-22 and II, 57-63), speak of them as having been made the day before. *Récit*, 19; *Revue de la révolution*, XI, *Documents inédits*, 12-14.

¹Our sources of information for the debate on May 14th are, *Récit*, 19-22; Duquesnoy, I, 19-23; Biauzat, II, 57-59; *La révolution française*, XXIII, 365-67; *Revue de la révolution*, XI, *Documents inédits*, 12-16; *Courrier de Provence*, *Lettre* III, 6-7, IV, 1-4; *Etats-généraux*, 31-33. It is explained in the preceding note that the *Etats-généraux*, 31-33, and the *Journal des états-généraux*, I, 23-27, by mistake, put the two motions of Rabaut de Saint-Etienne and Le Chapelier on May 13. Malouet made his motion on May 15, however, so both of these works make the same mistake again. See Biauzat, II, 58; *Courrier de Provence*, *Lettre*, IV, 4-7. Duquesnoy, I, 23, puts Malouet's motion on May 16 even.

the nation—a principle which should be accepted with enthusiasm even by the clergy and by the nobles themselves and which ought to influence them in the determination to unite themselves with the commons in the general hall, where they have been awaited for the last ten days, and of forming themselves into the states general in order to verify the credentials of all the representatives of the nation. The deputies of the commons invite those of the clergy and the nobles who have received special instructions to deliberate in common, and those who, free to follow this patriotic impulse, have already manifested their willingness to do the same, to give an example to their colleagues by coming and taking the place destined for them.

“It is in this general assembly, it is in this union of all the sentiments, of all the wishes and of all the votes, that will be determined, upon the principles of reason and of equity, the rights of all the citizens. . . . Those who will still delay the accomplishment of such important duties—labors that will assure public happiness and the splendor of the state—are responsible for their actions to the nation.

“The deputies of the commons vote that the present deliberation shall be sent to the deputies of the clergy and of the nobles, in order to call their attention to the obligations which the role of national representatives places upon them.”

Le Chapelier had prepared his motion with great care. It contained the essential points of the fundamental question of vote by person or by order which had been discussed for months. It was practically the same as that presented to the assembly by Sieyès on June 10. Between May 14 and June 10 more and more deputies were prepared to carry it into immediate execution, so that by the latter date the *tiers-état* could, because of the unanimity of its members, take the action outlined in this motion with a high degree of success. But even on May 14 Le Chapelier did not speak for himself only; he was the appointed spokesman of other deputies. The nucleus of the supporters of Le Chapelier's motion was the Breton deputation, of which he was the most prominent member.

Previous to the deputations of the nobles and of the clergy on

May 13 the Breton deputies strongly favored the policy of inaction, waiting for the deputies of the other orders. Delaville Le Roulx writes to his constituents of Lorient on May 8 that he tried to convince Malouet on the evening of May 6 that the plan of sending a deputation to the other orders inviting them to join the deputies of the *tiers-état* was unwise. Legendre writes on May 13, most probably before the deputations of the nobles and of the clergy, that the commons hesitated "still to constitute themselves as representatives of the nation."¹ And Boullé writes on May 15 that the commons had persisted in their policy of inaction, waiting patiently for the appearance of the deputies of the clergy and nobility; that the deputation of the nobles on May 13 had changed the situation, however. "It was a little late when this deputation was received; we adjourned therefore at two o'clock as usual without taking any action in regard to it. But yesterday morning [May 14] it was said that the intentions of the nobles were now known; that the proper moment for action had therefore arrived." He then gives a good analysis of the two motions and of the debate that followed. He does not mention the fact, however, that Le Chapelier had been appointed, nor that his motion was supported by the Breton deputies, which he does in his succeeding letter written on May 22.²

Since the deputations of the nobles and of the clergy on May 13, the commons, wherever they met, discussed the plans they should adopt in regard to the other orders. The more they talked about the action of the nobles the more offended and excited they became. During the last week their hopes in the eventual union of the orders had steadily increased. They learned that they would all stand together in case of danger; but a peaceful adjustment was expected, for more and more deputies of the clergy,

¹*La révolution française*, XXXIX, 521-22.

²*Revue de la révolution*, XI, *Documents inédits*, 11-20. "Cette seconde motion venait de la Bretagne; elle avoit été convenue entre nous, et M. Chapelier chargé de la présenter l'avoit fait avec applaudissement," p. 16.

Kerviler, René: *Etude biographique sur Baudouin de Maisonblanche*, 16. ". . . L'autre, de M. Le Chapelier, combinée la veille dans une assemblée particulière des Bretons." *University Studies*, published by the University of Nebraska, II, no. IV, 247, study by Dr. Charles Kuhlmann.

among them some of the superior prelates, and of the nobles, among them men of the greatest influence, had expressed their willingness to join them at the first favorable opportunity. But this hope was now lost. Even some of the more moderate among the *tiers-état* interpreted the action of the nobles, not only as most insulting but as a veritable declaration of war; the gauntlet had been thrown into the arena; it was necessary to pick it up. It was said that a hundred nobles had declared that they would shed the last drop of their blood before they consent to vote by person.

It was for these reasons that many deputies of the commons who up to that time had favored delay decided on the afternoon and evening of May 13 that the proposition of the clergy should not pass the following day. More delay was considered not only useless but even dangerous; the nobility would never be persuaded to join the commons, and the people were becoming restless and demanded the organization of the states general; the commons would be compelled in the end to decide by their most resolute action the controversy in favor of vote by head anyway. They should decide it, therefore, at once, and then pursue an active policy.

The commons decided immediately after the two opposing motions were made that both should be considered together and that every deputy should be given the opportunity of expressing his opinions upon them before the roll should be called a second time for the vote. We must not infer, however, that those who clamored for a second speech were refused the floor.

The idea that the commons ought still to wait a short time before organizing themselves was developed by various deputies in their speeches.¹ Boissy d'Anglas counseled moderation and delay. "You have, gentlemen," he said, "to struggle in this moment against the natural arrogance of a courageous nobility, which believes that it must not take one step backward. In presenting yourself before it in such a direct manner, you exasperate it and arm it necessarily against you, while the voice of media-

¹For the account of the sessions of May 15 and 16 see: *Récit*, 22-24; Biauzat, II, 57-59, 63-65; *Revue de la révolution*, XI, *Documents inédits*, 13-14; *La révolution française*, XXIII, 366; Duquesnoy, I, 19-25.

tion may cause them to yield to persuasion. For these reasons, gentlemen, I favor the proposition of Rabaut de Saint-Etienne, but I do not reject the motion of Le Chapelier, which I only consider premature at the time. It seems well that we proceed step by step and advance slowly enough in order to be never forced to retreat."¹

Another deputy favored Le Chapelier's motion,² but only after the conferences had proved unsuccessful. He said: "Gentlemen, the two motions presented yesterday appear to me equally judicious; but the first for the present, the second for the future; the one is an actual working plan, the other indicates to us what we may do in several days. The honorable members who have submitted these propositions to the discussions of the representatives of the nation merit at once our eulogy. . . . Without doubt, gentlemen, it is indeed necessary to act alone if the two privileged bodies, insensible to our patriotic invitations, wish to consider the questions, which are already decided, of the union of the orders and the vote by head." To the objection made that the conferences would bring about no conciliation, he answered: "Granted, but is it not a success to conquer our constituents, to convince them that we have deliberated before we have acted?" And to the argument of losing time, he replied that it was no objection at all. "Instead of to-day, we shall be fully as well situated in a week to give to Chapelier's motion every attention that it merits; in a week, I assure you, judging from the reception that it has received, we shall find ourselves here with the same principles, the same firmness, the same patriotism; in a week, reinforced by the deputation from the capital, we shall not expose ourselves to the reproaches of having taken a decision, so infinitely important, without the cooperation of a portion, as considerable as precious, of our colleagues."

During these days of debate, in the beginning of every session, Rabaut de Saint-Etienne's motion seemed to be favored, but

¹*Journal des états-généraux*, I, 32-36.

²*Journal des états-généraux*, I, 36-43. This speech seems not to have been given in the assembly. Our source says, p. 36, that "le temps ne permet pas à l'un des députés de [le] lire publiquement à l'assemblée."

when the members were stirred up by the discussion they became bolder and Le Chapelier's more resolute proposition gained support.¹ It was then that such revolutionary ideas as the following were expressed: "the *tiers-état* is the nation, the privileged classes are only small fractions thereof; my opinion is that we ought to go and declare it to them to-day, or tomorrow at the latest, and that we act upon this principle"; "a nation ought to exist without privileged classes"; "until today we have remained inactive, but it is the slumber of the lion, which when it is awakened rushes more ferociously upon its prey." Duquesnoy wrote that the motion of Rabaut de Saint-Etienne would probably carry, "but I doubt not that before the end of the month the *tiers* will determine to declare that it is the nation, that it alone is the nation."²

Practically all the deputies of the *tiers-état* agreed with Le Chapelier that they should constitute themselves as a national assembly with as many deputies of the clergy and of the nobles as would join them. They disagreed only as to the most suitable time for taking this action. This vacillation showed in itself that the third estate was not yet ready to take the decisive step. The leaders, such as Mirabeau, saw this, and, for this and other reasons already mentioned, they counseled delay. Mirabeau proposed a compromise between the two conflicting plans. He showed the merits and demerits of the two motions. But the motion of Rabaut, he considered weak, suppliant, and therefore humiliating to the commons. He suggested therefore that they invite the clergy, not the nobility, "because the nobility orders while the clergy negotiates." He said that the nobility could not be conciliated.³

¹Biauzat, II, 64-65.

²Duquesnoy, I, 19-20, 22.

³*Courrier de Provence, Lettre IV*, 8-17. Mirabeau spoke on May 15, for on the evening of that day Duquesnoy (I, 22) writes: "Le comte de Mirabeau a voulu parler modérément, mais il n'a pu faire taire son caractère longtemps; il a percé bien vite. . . ." The *Récit*, 22-23, gives the import of it under the date of May 15. The secret agent to a minister speaks of it on May 17 in a letter written at Paris (*La révolution française*, XXIII, 366). He writes for the first time about the motions of Rabaut de Saint-Etienne, Le Chapelier, and Malouet and says that Mira-

On May 16 Target appeared for the first time in the assembly and strongly favored the election of commissioners. He had been president of the electoral college of the *tiers-état* of Paris, was elected deputy of Paris (beyond the walls) and as such and because of his ability and popularity had a great deal of influence.¹ Rabaut de Saint-Etienne, accepting various suggestions made in the course of the long discussion, made two amendments to his motion. Commissioners to meet those chosen by the other orders should be elected, but with the understanding (1) "to limit the conferences of the commissioners to the question of verification of credentials in common" and (2) "to oblige these commissioners to render a written account of the conferences." Until the end of the session these amendments were principally discussed.² On Sunday, May 17, the deputies took a holiday. Just as soon as the first roll call was ended the next morning, the second call was started. The motion of electing commissioners with the two amendments was adopted by a very large majority. The commissioners elected were therefore not allowed to discuss the question of a single or separate chambers.³

The first two conferences of the conciliatory commissioners were held on May 23 and May 25. Long arguments ensued. The commissioners of the nobility attempted to prove historically that the credentials of the deputies to the states general had been verified in separate chambers, while the commissioners of the

beau, Volney, and Target discussed them. Mirabeau's journal itself states, (p. 8) after having reproduced Malouet's motion, which it says was made on May 15, that the debate was continued until May 18, but that it would give only one discourse which in a sense was a résumé of the whole discussion. The speech is without doubt that of Mirabeau; his speeches were, however, revised at times before they were printed.

¹*Procès-verbal . . . des électeurs de Paris*, I, 4-54.

²Accounts of the session of May 16 are found in the *Récit*, 23-24; *Revue de la révolution*, XI, *Documents inédits*, 15-16; Duquesnoy, I, 23-25; Biauzaat, II, 65; *La révolution française*, XXIII, 366.

³Biauzaat, II, 68, says that seven voted for the first motion, thirty-three for the first motion with the first amendment, and three hundred and twenty for the first motion with the two amendments, and sixty-six for the second motion. *Revue de la révolution*, XI, *Documents inédits*, 16, Boullé says that sixty-six voted for the second motion and that the first with its two amendments had a plurality of three hundred and twenty votes. *Récit*, 24; *Etats-généraux*, 44.

third estate, appealing to justice and reason, claimed that a national assembly was indivisible, that the credentials ought to be verified in common.¹ The discussion turned, therefore, altogether about the question of verification of credentials, for the commissioners had been instructed to confine themselves to it wholly. They were not permitted to touch the real question at issue—vote by head or by order. This command, together with the choice for commissioners of uncompromising deputies, shows that nothing good was expected from the conferences as far as the question under discussion was concerned.² The results of the conferences were foreseen. Duquesnoy wrote: "It is very evident that these conferences can produce no other effect than to cause greater irritation and antagonism." Again, "The nobility will never adopt the vote by head, the *tiers-état* never vote by order, and the nobility will refuse the common verification of credentials. The nation alone has the right to verify them; it is therefore necessary for the *tiers* to declare itself the nation."³ Another writer, a close observer, wrote:⁴ "If this conciliatory

¹*Récit*, 36-37; Duquesnoy, I, 45-47; *Courrier de Provence, Lettre VI*, 2; Biauzat, II, 80-82.

²The commissioners of the commons were in order named: Rabaut de Saint-Etienne, Target, Chapelier, Mounier, Dupont, D'Ailly, Thouret, Le Grande, Milscent, Salomon, Volney, Redon, Viguier, Garat l'ainé, Bergasse, Barnave. See *Récit*, 25; Duquesnoy, I, 27-28; *La révolution française*, XXIII, 443-44; Biauzat, II, 70-71. Those of the nobility: Bouthilier, le duc de Luxembourg, La Queuille (de), d'Antraigues, de Pouille, le duc de Mortemart, de Cazalès, de Bressand. See *Courrier de Provence, Lettre IV*, 19; Biauzat, II, 72. Those of the clergy: L'archevêque de Bourdeaux, l'évêque de Langres, Coster, chanoine de Verdun, Dillon, curé, Richard, Thibault, curé, Lecesve, l'archevêque de Vienne. See *Courrier de Provence, Lettre II*, 10. Biauzat, II, 72.

³Duquesnoy, I, 32, 33, 37. Bulletin written on May 22.

⁴*La révolution française*, 367. Under the date of May 18. Also on May 23 (488), the writer expresses the same idea: "Tous les partis ne pensent et ne s'occupent dans ce moment que de la question qui divise les trois ordres. Celui du tiers paraît réunir la très grande majorité des citoyens et l'on pense généralement que les deux premiers ordres seront forcés de se réunir à lui. . . . En tout événement, on assure que le tiers se constituera en corps national et que la noblesse jouera un mauvais rôle. On dispose les provinces d'après ce principe et ceci mérite l'attention la plus sérieuse." *Hérald de la nation*, vol. for 1789, no. 46. In the *Hérald de la nation* of May 22, after the motion of Chapelier is discussed, the writer says, "D'après l'exposition de leur marche, et si la réunion désiré n'a pas lieu, les communes sont, à ce qu'on assure, déterminés à se déclarer l'en-

undertaking on the part of the *tiers* does not bring about the union of the first two orders with the third, in order to verify credentials and then vote by head upon all questions submitted to the decision of the states general, it appears decided that the *tiers* will constitute itself as a national assembly and act in this capacity without the participation of the first two orders."

The report from the commissioners of the conferences was taken up in the assemblies of the three orders on May 26, but the third estate did not act upon it until May 27. It profited, therefore, by the action of the other orders on the report.¹ The nobility decreed again that the credentials should be verified separately.² This decree was read in the assembly of the commons on the morning of May 27 and brought about another attempt of the radical party to organize the assembly.³ The deputies were indignant that the nobility followed such a two-faced policy as taking part in conciliatory conferences and declaring itself at the same time constituted as a separate chamber, two diametrically opposite plans.⁴ Chapelier's motion of May 14 was in substance often repeated and was gaining more supporters. Another step towards the realization of the principle of vote by head was taken on May 27. Mirabeau's advice of May 18 was accepted—the nobility was dropped out of consideration⁵—and

semble de la nation, à se constituer comme ses représentants naturels et légitimes, et en cette qualité, à s'occuper des affaires publiques, conjointement avec ceux de l'église et de la noblesse qui voudront se joindre à elles." Biauzat, II, 88.

¹*Récit*, 37; *La révolution française*, XXIII, 451-52, 454.

²*Récit*, 38; Biauzat, II, 86; Duquesnoy, I, 48: "La noblesse a arrêté . . . qu'elle se tenait de nouveau pour bien constituée, les pouvoirs bien vérifiés." *La révolution française*, XXIII, 452. It was announced to the commons by other commissioners that "l'ordre de la noblesse s'était décidé refusé à la réunion, demandé la vérification en commun des pouvoirs des députés de tous les ordres."

³*Récit*, 38: "Pour cette tenue d'états-généraux, les pouvoirs seront vérifiés séparément, et que l'examen des avantages ou des inconvénients qui pourraient exister dans la forme actuelle sera remis à l'époque où les trois ordres s'occuperont des formes à observer pour l'organisation des prochains états-généraux."

⁴*Récit*, 38; *La révolution française*, XXIII, 454-55: "Cette déclaration a faite une sensation incroyable dans l'esprit de tous les members; un bruit sourd annonçait l'indignation."

⁵*Récit*, 39; Duquesnoy, I, 48: "Toute idée de réconciliation avec la

since many of the *curés* expressed themselves as willing and even desirous of joining the assembly of the commons, it was decided to wait a short time longer and to bring the greatest pressure to bear upon the clergy in order to persuade them to take the decisive step, to join the assembly of the commons at once.¹ The following summons was drawn up: "Gentlemen, the deputies of the commons invite the gentlemen of the clergy, in the name of the God of peace and of national interest, to unite themselves with those deputies in the hall of the general assembly, in order to consider plans which will bring about concord, that at present is so necessary to public welfare."² This proposition was accepted unanimously and was carried to the hall of the clergy by a large number of deputies.³ This invitation, couched in such solemn language, together with the solemn and imposing deputation, worked like a charm upon the clergy. A large number wanted to accept the summons at once; they did not care to deliberate upon the subject. Nevertheless a violent discussion arose; the *curés* forgot their clerical subordination. The question did not come to a vote, for it was already late in the day when the deputation appeared, and by the next day much of the enthusiasm at first manifested had disappeared; the higher clergy had again control of the chamber.⁴ The deputies of the third

noblesse a été rejetée, et jamais la haine contre cet ordre, le mécontentement qu'inspire sa résolution ne s'est si clairement manifesté."

¹*Récit*, 38-39; *Courrier de Provence, Lettre VI*, 3: "Le 27, plusieurs membres ayant déclaré qu'ils avaient reçu, de la part des ecclésiastiques de leurs baillages, de pressantes invitations pour que les communes fissent auprès de leur ordre une démarche solennelle, qui déciderait infailliblement le clergé, à une réunion dans la salle nationale."

²*Récit*, 39; *Courrier de Provence, Lettre VI*, 7; Biauzat, II, 85; Duquesnoy, I, 48; *La révolution française*, XXIII, 454.

³*Ibid.*

⁴*Récit*, 39; Duquesnoy, I, 50: "Il paraît que la levée de la séance est l'ouvrage du haut clergé, qui a craint que les curés ne prissent une détermination favorable au tiers. Au reste, je suis convaincu qu'on exagère beaucoup les dispositions des curés, parmi lesquels le plus grand nombre, subjugués par les évêques ou maîtrisés par leurs intérêts personnels, ne se prêteront jamais à l'opinion par tête"; *Courrier de Provence, Lettre VI*, 7; Biauzat, II, 86-88, 91: "Le haut clergé aperçut sensiblement la disposition des curés à se rendre dans la salle de l'assemblée nationale. En conséquence, et n'ayant pu éluder cette délibération par les délais proposés, il chercha un moyen de rompre la délibération même"; *La révolution fran-*

estate were disappointed. They had considered this invitation of such vast importance and they knew that in order to bring the *curés* to the general hall it had to be done in the heat of enthusiasm, that some of them decided not to separate until they had an answer from the clergy. But the attempt once more failed. Had the clergy joined at this time, the outcome would probably have been the same as later, namely the union of the three orders.

As it was, the invitation had the effect of stirring up more enthusiasm in favor of the cause of the third estate and also of frightening the privileged classes, who appealed to the king for assistance, and with some success, for the next day a letter from him urged the three orders to renew the conciliatory conferences in the presence of royal commissioners.¹ Thus while the commons believed themselves on the point of escaping from their embarrassments and of reaching a solution of the disputed question, they saw themselves cast back into a series of inextricable difficulties. Mirabeau wrote: "This letter has become the object of the most important discussion which the commons have had so far."² Some deputies favored the continuation of the conferences, "but a great number of speakers, and especially the Bretons," opposed further conferences. They gave two rea-

çaise, XXIII, 454-55: "Le tiers a paru persuadé que tous les curés et même quelques évêques étaient décidés à l'adopter sans réserve et sans délai; on attendait d'un moment à l'autre une réponse favorable du clergé et l'on était résolu de ne pas se séparer sans l'avoir reçue. . . . Le tiers est persuadé que le haut clergé a cru prudent et convenable à ses principes de gagner du temps. Cette ruse ne paraît pas l'alarmer. Il compte d'autant plus sur la fermeté des curés, qu'on leur a insinué que, s'ils variaient dans leurs principes, ils feraient sagement de ne plus paraître dans leurs bénéfices. On espère que dans la séance de demain (May 28) la réunion du clergé et du tiers sera arrêtée. Que cette réunion ait lieu ou non, le parti du tiers paraît pris sans retour; il se constitue tout de suite en corps national et s'adresse seulement au roi pour commencer la tenue des états-généraux."

¹*Récit*, I, 42; *Courrier de Provence, Lettre VII*, 2; Duquesnoy, I, 52-53; Biauzat, II, 91. Biauzat says that during the night of May 27 to 28 from twenty-five to thirty bishops met and agreed to ask the king to use his authority or his influence in favor of the continuation of the conferences.

²*Courrier de Provence, Lettre VII*, 3: "Cette lettre est devenue l'objet de la plus importante délibération qu'aient encore débattée les communes;" Duquesnoy, I, 53; *La révolution française*, XXIII, 455-57. When a committee of the clergy announced to the commons that the king had sent a letter, the writer says: "Pour se faire une idée de la surprise du tiers-état et des

sons: the uselessness of the conferences was well demonstrated, and, secondly, they feared that the king, in taking up the matter, might wish finally to decide the question which the representatives of the nation alone should decide; they desired that the assembly "constitute itself at once as national assembly."¹ Had the leaders at this time championed the demand for action, they might have been successful, but they saw more clearly than ever the advantages of delay and the inconveniences that might result from a refusal. The leaders feared to alienate at the same time the government and public opinion, to compromise the future by appearing too arbitrary. Even Chapelier counseled compliance with the wishes of the king. His motion was a curious one. He, as well as Mirabeau, saw that the king had to be reckoned with, and they favored the sending of an address to the king in which it should be assumed that he had convoked a national assembly which was indivisible.² Mirabeau proposed: "The king has addressed to us a homage filled with goodness: let us present to him an address full of love, an address in which we consecrate

murmures que la députation a excités dans la chambre, il faut en avoir été témoin. Il n'y avait qu'une voix pour se plaindre de la conduite du clergé, de ses ruses et de ses perfidies. Revenus de leur étonnement, quelques membres ont fait des motions relatives à l'objet de la députation."

¹Duquesnoy, I, 53: "Mais un grand nombre de voix, et notablement les Bretons, s'opposèrent à ce qu'on assistât aux conférences: 1° à raison de leur inutilité démontrée; 2° dans la crainte que le roi ne prononcât sur une question que la nation doit seule juger, et ils voulaient que l'on se constituât à l'instant en *assemblée nationale*." *Archives parlementaires*, VIII, 58; *Courrier de Provence*, Lettre VII, 2; *La révolution française*, XXIII, 456-57.

²*Récit*, 46-48: "Il sera fait à Sa Majesté une très humble adresse, pour lui exprimer l'attachement inviolable de ses fidèles communes à sa personne sacrée, à son auguste maison, et aux vrais principes de la monarchie; pour témoigner à Sa Majesté leur respectueuse reconnaissance de ce que, dans sa sagesse et sa bonté pour ses peuples, Sa Majesté a convoqué, non trois assemblées distinctes de trois ordres séparés d'intérêts et de vues, mais *l'assemblée nationale*, . . . les communes du royaume ont autorisé leurs commissaires à assister à la conférence à laquelle Sa Majesté a daigné les inviter, et l'informer en même temps qu'intimement convaincues que les députés des différents ordres sont députés à une seule et même assemblée, *l'assemblée nationale*, la vérification de leurs pouvoirs ne peut être définitivement faite et arrêtée que dans *l'assemblée nationale*; et déterminées, comme elles y sont obligées par les ordres de leurs commettants, à ne reconnaître pour députés à *l'assemblée nationale* que ceux dont les pouvoirs auront été vérifiés et approuvés dans ladite assemblée. . ." Chapelier favored the constitution of the conferences asking that the commissioners

both our sentiments and our principles.”¹ Some deputies made mention of the fact that on that very day—in the morning session of May 28—the assembly of the nobility had formally declared itself in favor of orders, and that it would persist in upholding this principle. These deputies maintained that a continuation of the conference was entirely useless, that every attempt to conciliate the nobility would fail.² The clergy, and the nobility too, accepted the king’s request to continue the conferences.³ The commons did the same, though with great reluctance and on the condition that “of each session a *procès-verbal* shall be drawn up and signed by all those who have taken part in the conferences, in order that the conferences may not be called into question.”⁴ The deputies of the third estate accepted the king’s invitation because it was policy for them to do so; they did not wish, nor could they afford, to be considered obstinate by the public.

The conferences were renewed, the commissioners of the king being present.⁵ Seemingly trivial matters were discussed, such as whether the minutes of the sessions should be kept. There was disagreement in regard to having a secretary, and, after it was decided that there should be one, a discussion ensued as to whether he should be chosen from one of the commissioners

of the commons “feront tous leurs efforts pour que cette conférence ait lieu dans la salle commune . . . lorsqu’il s’agit des droits les plus précieux des communes, elles ne peuvent prendre ni juges ni arbitres.” *La révolution française*, XXIII, 458; Duquesnoy, I, 53-55; *Courrier de Provence, Lettre VII*, 13.

¹*Courrier de Provence, Lettre VII*, 4; Duquesnoy, I, 56.

²*Récit*, 44; *La révolution française*, XXIII, 457: “Qu’a voulu dire le roi en nous annonçant ses intentions de vouloir contribuer directement à une harmonie si désirable et si instante? Nous sommes les maîtres des moyens à employer et son intervention est préjudiciable à nos droits. Que produiront de nouvelles conférences? Le parti de la noblesse est pris et la trahison du clergé est manifeste.”

³Duquesnoy, I, 52; Biauzat, II, 96.

⁴*Récit*, 48-49, 57-58; *Courrier de Provence, Lettre VII*, 14, 15; Biauzat, I, 89-90, 93; *La révolution française*, XXIII, 458-59; Duquesnoy, I, 56.

⁵*Récit*, 56-59, 64-68, 68-74. The king’s commissioners were: MM. le garde-des sceaux, “le duc de Nivernais, de la Michodière, d’Ormesson, Vidaud de la Tour, Chaumont de la Galaizière, le comte de Montmorin, Laurent de Villedenil, le comte de la Luzerne, le comte de Puysegur, le comte de Saint-Priest, Necker et Delessart.” Biauzat, II, 94-95.

or from outside the assembly. The deputies of the nobility most resolutely refused their signature to the *procès-verbal*, if the commissioners of the third estate gave to their order the title of *communes*.¹ Bailly wrote:² "To call themselves the *communes de France* was, in the eyes of the nobility and of the clergy, almost the same as to call themselves *la nation*." The deputies of the third estate from the very opening of the states general had assumed the name of commons; they did not wish to appear the deputies of the third estate and they opposed the idea that the nation consisted of three estates. France was a nation, one estate, and they claimed that all the deputies to the states general, or the national assembly, equally represented this nation. The fact that the deputies of the third estate called themselves the commons is very significant; it shows how and what they considered themselves, and it helps to explain their purpose in this struggle with the other orders.³

After the commissioners of the nobility had wearied the other commissioners by raising objections to their requests, the real question was considered. The old arguments in regard to the verification of credentials were repeated until all the commissioners became utterly impatient with the discussion.⁴ Finally on

¹*Récit*, 64, 89-93; *La révolution française*, XXIII, 522-23, 471; Duquesnoy, I, 69-70; Biauza, II, 95; Bailly, I, 95, 97-99, 104-7.

²Bailly, I, 95.

³The Breton deputies, being organized, had perhaps the most advanced ideas; they had a great influence upon the assembly. In the *cahier* of the *Sénéchaussée de Rennes*, (*Archives parlementaires*, V, 538) article two, we read: "C'est par une erreur funeste que ce qu'on appelle le tiers-état, ce qui compose plus des quatre-vingt-dix-neuf centièmes de la nation, a été qualifié d'ordre et mis en balance avec deux classes de privilégiés! Cette erreur doit cesser, et ce qu'on a jusqu'ici nommé le tiers-état dans le royaume, sera compris avec ou sans les privilégiés sous la même dénomination et appelé peuple ou nation, seuls noms qui soient véritables et qui puissent convenir à la dignité du peuple; cette dignité sera toujours présente aux yeux de ceux qui auront l'honneur de la représenter; ils ne souffriront pas qu'il reçoive nulle part dans leur personne ou autrement aucune humiliation . . ." Article four: "Toutes délibérations définitives seront prises dans l'assemblée générale, et par tête, la délibération par classe des privilégiés ne pouvant qu'anéantir l'esprit public, faire dominer l'esprit de corps, multiplier des querelles, mettre un obstacle éternel aux lois et aux réformes les plus nécessaires; enfin soumettre vingt-cinq millions d'hommes aux despotiques volontés de quelques milliers d'individus."

See also *Archives parlementaires*, IV, 94, the *Sénéchaussée de Nantes*.

⁴*Récit*, 93-94; Bailly, I, 107: "La noblesse disputait le terrain pied à

June 5, Necker proposed a project which he thought would conciliate the three orders.¹ But this plan, that he called an *ouverture*, was really to the disadvantage of the third estate, and instead of conciliating the commons it aroused them to action. It really favored separate verification of the credentials. A stormy debate arose in the hall of the third estate as to whether Necker's plan of conciliation should be considered *before* or *after* the closing of the *procès-verbal* of the conferences, and it was decided by a vast majority that it should be taken up for discussion only after the conferences were terminated.² It was expected that they would last but a few days. This postponement meant that Necker's plan should not be considered at all, for how could a subject of the conferences be considered after their close? The commons did not grant the government any opportunity to interfere in the affair of the verification of credentials and of the vote by head or by order. They were ready to organize and were only waiting for the end of the conferences and the signing of the *procès-verbal* by the commissioners in order to act. They thought that the minutes signed by all the commissioners would justify their action in the eyes of the public and that it was, therefore, important to wait. The clergy adopted the *ouverture*, but the nobility accepted it only conditionally, which was in fact a refusal.³

The third estate saw this subterfuge. They considered the *ouverture* as an interference on the part of the government in a question that pertained strictly to the deputies of the states general and they became alarmed, because there were rumors of a royal session in which the king would dictate his wishes to the three orders.⁴ On the morning of June 6, the commons began the discussion of measures preparatory to organization, so that

ped, et c'est ce qui fatiguait les communes, c'est ce qui semait l'aigreur et préparait tous les maux . . ." *Courrier de Provence, Lettre IX, 2-11.* Mirabeau analyses the project and gives the king's purpose.

¹*Récit*, 74-78; *La révolution française*, XXIII, 469-70; Duquesnoy, I, 71.

²*Récit*, 78-79; *La révolution française*, XXIII, 470-71; Duquesnoy, I, 72-73; *Courrier de Provence, Lettre IX, 2*; Biauzat, II, 93.

³*Récit*, 81, 86; Duquesnoy, I, 71, 74; Biauzat, II, 96; *La révolution française*, XXIII, 520.

⁴Ford, P. L.: *The Writings of Thomas Jefferson*, V, 99-101; Letter

in case of an emergency they could constitute themselves and act instantly.¹ A deputy proposed rules of order for the government of the assembly and rules which should regulate the manner of presenting the motions, the debates, and the voting. But the assembly was interrupted in this work by the appearance of a deputation from the clergy which announced that the king's *ouverture* was accepted by their order.² Various other questions presented themselves so that the matter of organization had to be set aside. Later in the day the same committee of the clergy presented itself with a proposition which called forth from many members of the third estate expressions of disgust against the clergy.³ It convinced many deputies, who heretofore had believed in the coming union of the deputies of the third estate and of the clergy, that it was necessary for the commons to organize and to constitute themselves alone, that they could no more depend on the clergy than on the nobility.⁴ This committee announced that the clergy was "profoundly touched by the misery of the people and by the high price of grain which afflicted the provinces," and they proposed that the three orders should appoint committees who together should consider plans for the alleviation of that evil.⁵ "A general murmur" and "the most profound silence succeeded" this proposition. The note was read once more when the committee had left the hall. Then various motions were made, such as to ignore the proposition or to consider it only after the assembly was constituted; again, that it

written on June 3, 1789; *La révolution française*, XXIII, 363. Troops were assembled in the neighborhood of Paris.

¹*Récit*, 81; *Courrier de Provence, Lettre X*, 1.

²*Récit*, 81; *La révolution française*, XXIII, 520.

³*Récit*, 84; the commons were already discontented, because of the king's *ouverture*, and, furthermore, they had been humiliated by the king. *La révolution française*, XXIII, 469; Duquesnoy, I, 65, 70.

⁴Duquesnoy, I, 76-77: "Le clergé a cherché à tendre un piège dans lequel il est tombé lui-même. . ." *La révolution française*, XXIII, 521, 523: "L'effet de cette députation a été de soulever tous les membres du tiers-état. La commotion a été générale et tenait de l'effervescence, du délire. Jamais, non jamais, la chambre n'a été dans une telle agitation. Les motions faites à ce sujet sont extrêmes."

⁵*Récit*, 84; *Courrier de Provence, Lettre IX*, 16; Biauzat, II, 96; Duquesnoy, I, 76; *La révolution française*, XXIII, 521.

was necessary to answer it at once; but a third party saw the intentions of the framers of the clergy's plan, namely to entrap the deputies of the third estate. A deputy explained the evident purpose of the proposition: to accept the plan would cause delay in constituting the assembly, and delay would have its evil and irreparable consequences. But rejection would draw down the disfavor of the king upon the assembly, and the public would accuse the commons of being the cause of the misfortunes and of being insensible to the public misery: "they will lose the confidence of the people, and with it the means to help them."¹

Invectives against the clergy were not spared. It was proposed to denounce their resolution to the king and to the nation as seditious.² "Complaints against their wives were heard, and against their perfidies, against their enormous riches and against the scandal which was produced by the employment of their wealth. It was said that the property of the clergy belonged to the poor and that it ought to go to them."³ This violence must have spurred the higher clergy to greater opposition to the cause of the third estate. The expressions used against the clergy in this heated discussion pointed already to the abolition of the feudal rights of the famous night of the 4th of August. But the deputies of the third estate soon saw the advantage of calmer deliberation and, artful as was the device of the clergy, the assembly of the commons contained men who could meet the emergency. It was suggested that before the consideration of the proposition of the clergy, the commons should summon the deputies of the clergy to present themselves in the hall of the states general and unite themselves with the commons in order to consider plans which might result in relieving the poor. It was argued that, in case the clergy did not accept the invitation, their

¹*Récit*, 84-86; *La révolution française*, XXIII, 521; Biauzat, II, 96: "On croyait les deux parties également dangereuses pour le tiers-état . . . s'occupant d'affaires d'administration et y travaillant par commissaires nommés séparément par les chambres, on entraît en exercice d'états-généraux; . . . et l'on entraît en exercice en chambres distinctes, ce que le tiers-état voudrait éviter, parce qu'il craint de consacrer des abus."

²*Récit*, 85.

³*La révolution française*, XXIII, 521; *Récit*, 85; Dumont, 63, 64; *Moniteur*, I, 56-57.

true disposition in this matter would be discovered and their resolution would seduce nobody; and if, on the other hand, they should accept the invitation, the assembly of the commons would accomplish its end.¹ The dean read a project to be sent to the clergy. It was received by the commons with lively and repeated applause² and was carried to the hall of the clergy by a solemn deputation, but the attempt was again unsuccessful.³ There was left now no hope whatever of bringing all the deputies together in the assembly by peaceful means; the third estate could only wait for the conclusion of the conferences in order to organize as an active assembly. The conferences were closed on June 9.

But in the meantime preparations for the final step were made. Some members were restless and wanted to organize at once. Malouet proposed that the assembly should begin to verify the credentials of its members and constitute itself immediately thereafter.⁴ But the most of the deputies considered Malouet's motion premature and were wise enough to wait. They occupied themselves with rules of order and formed themselves into twenty committees, so that the organization, once begun, could be carried on expeditiously.⁵

When the dean at the opening of the session of June 9 asked if there was any business, all were silent. No one ventured to speak. It was the calm before the storm. But it was necessary to kill time, as the conciliatory conferences closed that day, and so the records of the last conferences were read a second time. The details in the arrangement of the committees were fixed.⁶

¹*Récit*, 85; Biauzat, II, 97; *Courrier de Provence*, Lettre IX, 17.

²*Récit*, 87; Biauzat, II, 97.

³*Récit*, 87.

⁴*Récit*, 96-97; *Courrier de Provence*, Lettre X, 2; Biauzat, II, 99; Duquesnoy, I, 79-80; *La révolution française*, XXIII, 523-24.

⁵*Récit*, 96, 97, 99; Biauzat, II, 99; *Courrier de Provence*, Lettre X, 1, 2; Duquesnoy, I, 79, 80; *La révolution française*, XXIII, 523, 524.

⁶Biauzat, II, 101: "Il n'est pas même levé un seul député. L'on ne sera par surpris de ce silence lorsque l'on saura que nous étions tous tenus dans un état d'indécision par des demi-ouvertures que l'on se faisait comme secrètement de quelques trames qui s'ourdissent pour la dissolution des états-généraux. L'importance de l'objet et l'incertitude des annonces formaient un embarras dans les bonnes têtes, et personne n'osait parler. Cependant il faillait tuer le temps."

On the evening of this day, the committees met and considered the question of constituting the assembly, and five-sixths of them agreed that the proper time for action had come.¹

After the bureaux had adjourned, many of the deputies and deputations met in order to still further discuss the all-important subject. The Breton meeting especially was largely attended. Boullé writes on June 10 that at nine o'clock the evening before, after he left his bureau, he "went to the hall of the Breton deputies; it was truly the temple of patriotism this evening; all the good citizens of all the provinces were assembled there. The means of constituting ourselves as an active assembly were examined and discussed, and it appears that the plan of M. l'abbé Sieyès is almost generally approved."² Sieyès' plan had been considered in the hall of the Breton deputies, which had become the rallying place for a large number of deputies of other provinces as well, on the evening of June 8. During the following day and evening most of the deputies of the *tiers-état* were informed of it.³ Those who up to this time had remained undecided were now convinced that organization was necessary and that further delay was dangerous, for it was widely believed that a royal session was to be held in the near future. The commons

¹Biauzat, II, 102: "On a indiqué un local pour la tenue de chacun de ces bureaux. Les députés se sont rendus chacun en son bureau, sur les 5 à 6 heures du soir, pour y conférer sur le projet de règlement dressé par les commissaires. . . Il a été question, dans plusieurs bureaux et dans presque tous, de la nécessité de nous constituer. Les cinq-sixièmes au moins pensent que le moment est venu de faire cette démarche." *La révolution française*, XXIII, 528. The bureaux were to meet on the evening of June 8: "L'assemblée s'est séparée et les bureaux se sont ajournés pour ce soir. Plusieurs étaient indiqués dans l'hôtel du grand-maitre. Quelques députés s'y sont présentés: ils ont été éconduits par les Suisses, qui les ont assurés n'avoir aucun ordre pour les recevoir. Trois bureaux seulement se sont réunis dans l'enceinte de la salle générale. On y a parlé de constitution et nous avons appris de bonne part que le résultat des conférences sur cette matière n'était pas de se constituer en chambre nationale, mais simplement en chambre des communes faisant les fonctions des états-généraux, jusqu'à la réunion des deux premiers ordres; c'est la modification qu'on se propose de présenter à l'assemblée; c'est déjà quelque chose. le temps achèvera le reste." *La révolution française*, XXIII, 525.

²*Revue de la révolution*, XII, Documents inédits, 49.

³*Ibid*, 40.

were therefore, on the morning of June 10, almost unanimously in favor of constituting themselves.¹

II

At the opening of the morning session of the commons on June 10, the dean announced that the *procès-verbal* of the conferences had been closed and signed by the eight commissioners of the clergy, by those of the commons, and by the secretary, and that it had been recorded in the minutes that the commissioners of the nobility had declared the *procès-verbal* exact in all its parts. The assembly by acclamation ordered the printing of these minutes. The dean stated further that, according to a previous decision of the assembly, the *ouverture* of conciliation, made by the king's commissioners, was to be considered after the termination of the peace conferences and the closing of the *procès-verbal*, and that the deliberation on the conciliatory plan was, therefore, now in order. He advised, however, that the discussion be postponed until the following day. He alleged as a reason for delay that the *procès-verbal* of the conferences of the preceding evening had not yet been laid before the assembly. But why did he not call for the report of the commissioners at once? The deputies favorable to the motion of Sieyès had requested and obtained from the dean this omission that the additional time might be given to the consideration of the proposed plan.²

¹Biauzat, II, 102: "Des conférences qui ont succédé aux bureaux et qui ont duré jusqu' après onze heures, ont rangé à cet avis le plus grand nombre de ceux qui étaient demeurés indécis jusqu'alors. Pour donner plus de poids à la motion qui doit conduire à ce but, on doit la faire présenter par M. l'abbé Siés (Sieyès)"; *La révolution française*, XXIII, 525: "On s'en occupera demain, si le procès-verbal des conférences est définitivement signé dans la réunion de ce soir. Plusieurs membres ont préparé des motions à ce sujet. On sait que M. l'abbé Sieyès doit en faire une et l'avis qu'on en a rendra l'assemblée plus nombreuse qu'à l'ordinaire. . . ." Duquesnoy, I, 83: Duquesnoy wrote in the morning of June 10, "C'est aujourd'hui qu'on doit délibérer sur la constitution." Sieyès, soon after his arrival at Versailles, associated with the Breton deputies who knew of him because of his monograph: *Qu'est-ce que le tiers-état?* See Zinkeisen, I, 62; Chérest, III, 119-22, 133, note, and 145; Aulard: *La société des Jacobins*, I, Introduction, II.

²*Récit*, 79, 100, 101; Biauzat, II, 102; *La révolution française*, XXIII,

The whole assembly was eager to hear what Sieyès had to say. But, now that the time had come, Sieyès seemed to hesitate. He should have taken the floor immediately after the dean's first statement. When he let the opportune moments slip by, Mirabeau became impatient, and when Sieyès kept the assembly in suspense after the dean's second remarks, which really were a suggestion to Sieyès, Mirabeau, to give him courage, called upon him, and stated¹ that the commons, in order not to expose themselves to the greatest dangers, must hesitate no longer; they must take a decisive step; and he concluded with the announcement that a deputy from Paris wished to propose a motion which was of the greatest importance. The assembly expressed its desire to hear the motion, and the dean called upon Sieyès.

It was in the midst of a profound silence that the famous deputy from Paris began his discourse. The session was well attended by the public, for it was known that the conference had been closed and that important business would be considered.² Like Chapelier and others who had made similar motions before, Sieyès reviewed the action of the deputies of the third estate since the opening of the states general, and their relations with the clergy and with the nobility.³ He described the circumstances that had prevented the organization of the states general, the proofs of good-will given by the commons, the obstinate resistance which they had encountered on the part of the other orders, the uselessness of the conferences, and the obstacles placed by the nobility in the way of every attempt at conciliation. He concluded that the commons could no longer remain in inactivity without neglecting their duties and without betraying the interests of their constituents. It was necessary to begin work. But it was impossible to form an active assembly, to constitute them-

526; *Revue de la révolution*, XII, *Documents inédits*, 50, 51; *Journal des états-généraux*, I, 53.

¹*Récit*, 101.

²*La révolution française*, XXIII, 525, 526; Duquesnoy, I, 83; Biauza, II, 102; *Revue de la révolution*, XII, *Documents inédits*, 39, 40, 49.

³*Récit*, 101-3; *Journal des états-généraux*, I, 53-56 (paging for the month of June); *La révolution française*, XXIII, 526; Duquesnoy, I, 83; Biauza, II, 102, 103, 105-7; *Courrier de Provence*, *Lettre X*, 3-7; *Revue de la révolution*, XII, *Documents inédits*, 51, 52.

selves, until they knew who should compose the assembly. The assembly had proved that the credentials could be submitted to no other judgment than that of the representatives of the nation collectively, and this principle, the truth of which was so well demonstrated in every page of the *procès-verbal* of the conferences, should not be abandoned. The nobility had refused the *ouverture* of conciliation, and by this act the commons were absolved from considering it, because the rejection of one party to a conciliatory plan annulled the plan. The assembly was therefore forced to act, and it could do nothing else than "summon the members of the two privileged chambers to present themselves in the hall of the states, in order to assist in, to concur in, and to submit themselves to the common verification of credentials."

After this brief exposition of the motives for action, Sieyès read the motion which has remained inseparably linked with his name. It explained the reasons for action and the objections against delay. The nation demanded from its deputies the best employment of their time. "The assembly considers it a pressing duty for all the representatives of the nation, no matter to what class of citizens they belong, to constitute themselves, without further delay, an active assembly in order to fulfil the object of their mission." The conciliatory commissioners were charged to draw up "an account of the long and vain efforts of the deputies of the commons for the purpose of converting the privileged classes to the true principles," to explain the reasons which forced the commons to action, and then to publish the account "as an introduction to the present resolution."

"But since it is impossible to form an assembly without a preliminary recognition of those who have the right to compose it, that is to say, those who are empowered to vote as representatives of the nation, the same deputies of the commons believe that they ought to make a final appeal to the deputies of the clergy and of the nobility who claim to possess the same powers, and who nevertheless have refused, so far, to allow themselves to be recognized.

"Furthermore, it is in the interest of the assembly to fix the

responsibility by putting on record the refusal of these two classes of deputies, in case they persist in the desire to remain unrecognized; the assembly thinks it indispensable to send a last invitation, which shall be presented to them by deputies who shall be charged to read it to them and to leave them a copy which is as follows:

“Gentlemen, we are charged by the deputies of the commons of France to inform you that they can not longer postpone the discharge of the obligations thrust upon all the representatives of the nation. It is certainly time that those who claim to be representatives should be recognized by a common verification of their credentials, and should begin at last to occupy themselves with the interests of the nation, which alone, and to the exclusion of particular interests, present themselves as the great end for which all the deputies ought to strive with a common effort. Consequently, and since it is necessary for the representatives of the nation to constitute themselves and act without further delay, the deputies of the commons invite you, gentlemen, anew, and their duty forces them to extend to you, individually as well as collectively, a last summons to come into the hall of the states in order to assist in, to concur in, and to submit yourselves like the commons to the common verification of credentials. We are also charged to inform you that the general call of all the *bailliages* convoked will be made in an hour; that immediately after the roll-call the credentials will be verified and default pronounced against those who do not present themselves.”¹

Immediately after reading the motion and the summons Sieyès explained that he had presented only the first part of his plan. The question at that moment was not how and with what powers the commons should constitute themselves. Such active resolutions were impossible until it had been determined what men were legally elected to the states general and had a right to take part in the organization. As soon as the preliminary step

¹*Courrier de Provence, Lettre IV, 58.* When Mirabeau on May 15 compared the motions of Rabaut and Chapelier, he brought out the idea of default against the orders; *La révolution française, XXIII, 452-53.* This same idea was expressed May 26, 1789, in the *Bulletins d'un agent secret*

to organization had been taken, that is, as soon as the credentials had been verified, he would present the second part of his plan. Furthermore, to enter default against those who would not present their credentials would neither establish nor announce a schism between the orders; that the clergy and the nobility could at any time raise the ban by uniting themselves with the commons, who would always gladly receive them.¹

Sieyès was enthusiastically applauded.² The motion answered to the general wish; it soothed the feeling of impatience that had seized upon even the calmest spirits. All the members of the assembly were familiar with the question, for it was the subject that had been most widely discussed, and, since the opening of the states general, had received the most serious consideration. Being thus prepared and having expected it, many members rose instantly in support of the motion.³ With much force and ability they developed the reasons which should determine the commons to follow the course suggested by Sieyès. The rational moderation which had so wisely guided the actions of the third estate in this long and fierce struggle with the privileged classes up to June 10 did not forsake the assembly in the discussion of this revolutionary step. The equable and judicious Target suggested that, since the assembly was not yet constituted,⁴ not *dernière sommation*, but *dernière invitation*; not *donné défaut contre les non-comparants*, but that it will proceed to the verification, as much *en présence qu'en l'absence des députés des classes privilégiés*, not *dans une heure*, but *dans le jour* would be a more

¹*Récit*, 104; Biauzat, II, 102-3: "Il y a ajouté un développement verbal pour faire apercevoir qu'il n'entendait pas nous proposer de nous constituer à l'instant ou de nous constituer dans la suite, en assemblée nationale dont les députés ecclésiastiques et nobles seraient exclus, ni en assemblée des communes qui sont l'assemblée nationale, moins les ecclésiastiques et les nobles, ni enfin en ordre distinct et séparé, mais en députés des bailliages et représentants de nos commettants, pour le nombre qu'ils forment dans l'assemblée de tous les Français."

²*Récit*, 104; *La révolution française*, XXIII, 526; *Revue de la révolution*, XII; *Documents inédits*, 52, 53.

³Duquesnoy, I, 83.

⁴*Récit*, 104; Biauzat, II, 103. Biauzat says that he himself made the suggestion of the changes. Duquesnoy, I, 84; *Moniteur*, I, 64, Target's speech; Chérest, III, 135.

fitting phaseology. Sieyès readily consented to these rational changes.¹

But the assembly of the commons was not even yet a complete unit on this question of organization. There were opponents, though but few, who caused more or less agitation. At first they had kept silent; then they attempted to impede the action of the assembly by keeping up the debate. But they made themselves obnoxious; they exhausted the patience of the deputies; they were violently and systematically attacked, hissed, and their voices even drowned by the clamor of the vast majority.² The opposition began by the declaration of a member that the motion was dangerous. He advised the adoption of the king's *ouverture de conciliation*, but this opinion found no support; it met with an organized attack. A Breton deputy said that it was a question of the very greatest importance to depart from a *laissez faire* policy, and it was folly to propose a course which must come to nothing since the nobility had rejected the *ouverture*. The request that the *ouverture* should be considered by the assembly was answered from all parts of the hall by the assertion that the discussion could lead to nothing, that it was entirely useless.

A deputy from Artois said³ that he favored Sieyès' motion, but added that it should contain the refutation of some of the principles expressed in the preamble of the *ouverture* against which an express protest seemed indispensable. He was answered that such objections were unnecessary as the *procès-verbal* of the conferences had taken account of those principles in the most satisfactory manner. But the deputy from Artois insisted; his amendment was supported by several members. Two other deputies urged that the assembly should wait until the clergy made reply to the last invitation of the commons.⁴ But the

¹*Récit*, 104, 108; *Journal des états-généraux*, I, 58-60; Biauzat (II, 103) says that he suggested the changes and the *Récit* that it was "un député de Bourgogne." See motion as adopted, *Récit*, 110-12.

²*Courrier de Provence, Lettre X*, 11; *La révolution française*, XXIII, 526; Duquesnoy, I, 84; *Récit*, 104-9; *Revue de la révolution*, XII, *Documents inédits*, 53, 54.

³*Récit*, 105, 106; Biauzat says (II, 103) that M. Camus, a deputy from Paris, made this amendment.

⁴*Récit*, I, 84-87. The invitation of June 6, that was called out by the clergy's deputation in regard to the relief of the poor.

answer to such a proposal was that it was altogether too indefinite. Again it was suggested that, since the policy of the clergy towards the commons had always been different from that of the nobility, the invitation to them should be worded differently. Mirabeau, who on former occasions had advised that the attitude of the commons toward the clergy should be different because of the different attitude of the clergy towards the commons, opposed this policy now. He agreed that the methods employed by the two orders in dealing with the commons were not the same, but that there was no difference really in their pretensions and in the result of their conduct. Both orders had remained apart from the commons; the last invitation to both orders was therefore equally indispensable. The phraseology in which the invitation was couched presented the motives upon which it was founded and the efforts which it was expected to produce. The motives for, and the effects of, the invitation were the same in regard to the clergy and to the nobility. The invitations, therefore, should be absolutely the same. If a different course were followed some inconveniences would certainly result from it. Mirabeau silenced the opposition. But now another member proposed that, together with the resolution of Sieyès, an address should be prepared and presented to the king.¹ This address should deal with the king's *ouverture de conciliation* and explain the course which the commons had been forced to follow. This amendment was well received. However, a deputy remarked that the king was perfectly well informed, that he knew of the refusal of his plan by the nobility and that, therefore, the address was useless. Furthermore, it would delay the action on Sieyès' proposition, which was indeed very urgent. The author of the amendment now hastened to state that Sieyès' motion ought to be adopted at once, but that it was also in the interest of the assembly to present an account of its policy to the king and to inform him of the motives that had determined the decision of the commons.

When, at last, the debates seemed terminated, another member

¹*Recit*, 106-7; *Journal des états-généraux*, I, 62; *Courrier de Provence*, *Lettre* X, 8; *Duquesnoy*, I, 84; *Revue de la révolution*, XII, *Documents inédits*, 53; *Biauzat*, II, 103. Biauzat says Lavenüe de Bazas.

asked that the motion be printed and that a copy be given to each representative, or at least that a copy should be sent to each of the twenty bureaux, where it could be examined and discussed anew. But the assembly was irritated by these repeated interruptions and delays; a general murmur of indignation arose against this proposition. A deputy from Metz¹ answered that the commons had tried all the means that the most ardent love of peace could dictate, and in spite of that they had met and still met with nothing but obstinate resistance to a demand founded upon the first principles of equity and reason; that, after five weeks of waiting, it was at last time to abandon a policy of inactivity; that Sieyès' motion embodied the only proper and legal course which the assembly could take; and that he was astonished that this motion could still meet with opposition, that it had given occasion to such debate; and a further demand for delay was certainly revolting in the extreme.²

The dean, encouraged by the almost universal and spirited applause which followed these remarks, declared the discussion closed.³ He was, however, interrupted by a deputy who demanded a double roll-call.⁴ It had been the custom of the assembly to give all members on a first roll-call an opportunity to speak and on a second roll-call to collect the votes.⁵ This plan had been followed, of course, only when important questions were considered; and the assembly up to this time had acted upon the principle that it had a great deal of time. But a unanimous objection might deprive a speaker of the floor. The assembly expressed anew its impatience; the speaker could not make himself heard. The dean put the motion with the changes consented to by its author. He added two amendments:⁶ (1) to express to

¹*Récit*, 107-8; Chérest, III, 137-38. Chérest thinks that this deputy from Metz was M. Emmery.

²*Ibid.*, 108: "Et que dès lors la proposition de l'impression et du renvoi de la motion dans les bureaux était révoltante sous tous les points de vue."

³*Ibid.*

⁴*Ibid.*

⁵*Ibid.*, 22-24, 44-45; Duquesnoy, I, 57.

⁶*Récit*, 108: "1. Exposer au roi les motifs de la délibération. 2. Réclamer contre les principes du préambule de l'ouverture de conciliation";

the king the motives for the action taken, and (2) to record objections against the principles expressed in the preamble of the *ouverture de conciliation*. According to Camus, 247 votes were in favor of the motion without any amendment, 246 votes for the motion with the first amendment. The remaining fifty-one votes were distributed among the rejection of the motion, its adoption with both of the amendments, and the reference of the motion to the bureaux.¹ The vote was therefore not decisive. It was felt that a majority vote was absolutely necessary to the adoption of such an important plan. The dean put an end to further debate by announcing another session at five o'clock in the evening, at which time the question should be decided.

In the evening session, a Breton deputy stated² that he had voted for the motion, pure and simple, for the reason that the matter of the address to the king could be considered after the passing of the motion, but he thought that those who had voted as he had done would vote for the address also. The question was put to the assembly and was almost unanimously accepted. In order to make the vote as decisive as possible and to render the general wish more evident, the dean asked that all those who had voted for the unamended motion and opposed the first amendment should rise. Only three members rose, so that in this manner the motion, together with the first amendment, was almost unanimously adopted.³ "In this manner," says Bailly, "was terminated, to the satisfaction of the assembly, the first of the most important deliberations; it is the first step which the assembly has taken towards its lofty destinies; the resolution contains the germs of all the great achievements of the month, and in it may

Courrier de Provence, I, 175; Biauzat, II, 103-4; Duquesnoy, I, 84; *Revue de la révolution*, XII, *Documents inédits*, 54.

¹*Récit*, 108-9, has the figures given in the text. *Courrier de Provence*, *Lettre X*, 10; Biauzat, II, 104. Biauzat doubts the truth of this count and gives it together with another count by M. Populus: "De cinq cent vingt-cinq, il y en a eu cent quatre-vingt-quatorze pour admettre la motion pure et simple, deux cent quatre-vingt-dix pour admettre la motion avec le premier amendement, une seule pour rejeter la motion." *Revue de la révolution*, XII, *Documents inédits*, 54.

²*Récit*, 110.

³*Récit*, 110; *Courrier de Provence*, *Lettre X*, 11; *Revue de la révolution*, X, *Documents inédits*, 54.

be discovered the essential principle which is the basis of the constitution."¹ It was agreed that the resolution and invitation as finally adopted should be drawn up at once and signed by the dean and his assistants. The assistants were instructed to carry the invitation and resolution to the two privileged orders at the opening of the next session, June 12. The conciliatory commissioners and Sieyès were charged to prepare the address to the king.²

June 11 was Ascension Day and no session was held. This was a great disadvantage to the commons, for the enthusiasm with which their resolution would have been received by the lower clergy was checked by the delay. Duquesnoy, writing on June 11, complained of the long discussions on June 10 in the hall of the third estate, and he did so with reason.³ Had the invitation been sent during the morning session of that very day, the probabilities are that a large proportion of the clergy would have united at once with the commons. The assembly of the clergy was divided into two groups, the higher and the lower clergy. The higher clergy favored the nobility; the lower clergy, or *curés*, the commons.⁴

On June 12, the ten, going to each chamber, delivered their message.⁵ The assembly of the nobility, through its president, answered the deputation of the commons that it would consider the invitation and send its answer.⁶ The deputies of the commons, while waiting for an answer to the invitation, considered the address to the king. A heated discussion arose upon the question as to whether the address should be read in the open assembly. But the debate was interrupted by a deputy from Paris, who called attention to the fact that it was now more than ever in the interest of the assembly to constitute itself and to begin work

¹Bailly, I, 134.

²*Récit*, 110-13.

³Duquesnoy, I, 84.

⁴*Mémoires du marquis de Ferrières*, I, 48; *La révolution française*, XXIII, 448.

⁵*Récit*, 114-16; Duquesnoy, I, 86; *Courrier de Provence*, Lettre X, 12; Biazat, II, 107-8; *La révolution française*, XXIII, 528; *Journal des états-généraux*, I, 65, 66; *Revue de la révolution*, XII, *Documents inédits*, 53, 56.

⁶*Ibid.*

as quickly as possible. A scheme should be devised for the most expeditious verification of credentials, and he proposed that the delegations, of which there were 172, of the three orders of all the *bailliages* should be called; that the deputations that were present should, as they were called, pass to the dean's desk and deposit there their credentials for registration; this done the credentials should be distributed among the twenty bureaus for examination, and that the results of this examination should be reported to the general assembly. This plan was well received and adopted in all its details.¹

The commons waited all day for the deputies of the other two orders. During the day, it was proposed to have the roll called at once, some members being impatient to begin the verification of credentials; but the dean promised that it should begin promptly at seven o'clock in the evening.² At five o'clock commissioners of the nobility appeared and reported that the invitation was being considered, but that no decision could be reached until the following session.³ The commons did not expect compliance from this order. The clergy sent no reply at all.

Now that the assembly of the third estate was on the point of constituting itself, before the roll-call began, it was decided that a *procès-verbal* should be kept of sessions.⁴ Heretofore the minutes of the assembly had not been kept by secretaries; the dean's assistants had taken a few notes.⁵ An official record of the assembly meant, it was thought, organization, and organization at this time meant three separate assemblies. But now that the commons had decided to form themselves into an active assembly and to do this independently of the other orders, if their invitation should not be heeded, an official record was necessary. This *procès-verbal* should be kept by secretaries and signed by them and the dean. Bailly was again chosen temporary dean and

¹*Récit*, 116, 117; *Courrier de Provence, Lettre X*, 12-24; Bailly, I, 138. Bailly says that this deputy from Paris was M. Sieyès.

²*Récit*, 117.

³*Ibid.*, 118; *La révolution française*, XXIII, 528.

⁴From this point on, my main source is the *Procès-verbal* instead of the *Récit*, which includes only the period from May 5 to June 12, 1789.

⁵As a result, we have the *Récit*. See *Bibliography*.

Camus and Pison du Galland temporary secretaries. They were to serve until the constituting process was completed and then they were to be superseded by regularly elected officers.¹

It was in the early evening of June 12 that the roll-call began.² As the secretaries read the names of the deputations of the *provinces, diocèses, bailliages, sénéchaussées*, and cities in alphabetical order, following the printed list, beginning with the sénéchaussée of Agen, the deputations, one after the other, advanced to the desk, and the first deputy of each delegation presented the credentials.³ After an all-day's session, the assembly adjourned⁴ to meet at nine o'clock the following morning.⁵

During the continuation of the roll-call on June 13, an incident occurred which gladdened the hearts of all the commons. Three deputies of the clergy, *curés* from Poitou, entered the hall.⁶ One of them, M. Jallet, described the scene as follows:⁷ "We were agreeably surprised to find the assembly so numerous, the colonnades, the galleries, all the standing room, were absolutely filled. On our arrival we were greeted with general applause, not only by the spectators, but also by the deputies of the commons. . . . The enthusiasm was very great. . . . The applause was renewed" when Lecesve, one of the *curés*, presented their cre-

¹*Procès-verbal*, I, 2; *Journal des états-généraux*, I, 73; Duquesnoy, I, 87; Biauzat, II, 108.

²*Procès-verbal*, I, 3. Seven o'clock. Boullé says that it was six o'clock; *Revue de la révolution*, XII, *Documents inédits*, 57; Duquesnoy, I, 87-88; Biauzat, II, 108; *La révolution française*, 528.

³The sénéchaussée d'Agen may serve to show the manner of the roll-call: "MM. du clergé, nul ne s'est présenté. MM. de la noblesse, nul ne s'est présenté. MM. des communes, se sont présentés MM. François et Renault, et ont remis leurs pouvoirs." *Procès-verbal*, I, 3; *Revue de la révolution*, XII, *Documents inédits*, 57; Biauzat, II, 108, 109.

⁴*Procès-verbal*, I, 19: "A neuf heures du soir;" Duquesnoy (I, 88) says ten o'clock; *La révolution française*, 528, says that the assembly adjourned at half past ten to eight o'clock the following morning. Boullé states, *Revue de la révolution*, XII, *Documents inédits*, 57, half past nine o'clock.

⁵*Procès-verbal*, I, 19.

⁶*Ibid.*, 28; Duquesnoy, I, 91; Biauzat, II, 109; *Revue de la révolution*, XII, *Documents inédits*, 57-58.

⁷*Journal inédit de Jallet, curé de Chérigné, député du clergé de Poitou aux états-généraux de 1789, précédé d'une notice historique par Brethé* (Fontenay-le-Comte, 1871), 86.

dentials. "The dean, M. Bailly, having with much difficulty obtained silence, I delivered the following discourse." M. Jallet spoke in favor of common deliberation. "We come, gentlemen," he said,¹ "led by the torch of reason, urged by love for the public welfare, to unite ourselves with you, our fellow citizens and brothers. We hasten to respond to the call of our fatherland, which urges us to establish between the orders peace and good will, upon which depends the success of the states general and the safety of the state. May this course be received, by the chamber of commons, in the same spirit that is influencing us! May this course, and this spirit, be generally imitated! May this, as a result, win for us the esteem of the entire French people." This speech was again followed by loud applause.² An established rule prohibiting applause was on this occasion conspicuously violated. Some deputies and some spectators, especially the women, were moved to tears. A member of the commons, Biauzat, wrote: "Although I pride myself on being a rigorist, I clapped my hands with a violence which makes plain to me that the heart adds force to our undertaking. Some persons have at this moment felt the sweetness of tears."

The deputies and the partisans of the third estate had reason to be elated. A first victory had been won, the barriers between the orders broken. These three *curés* had set the example for their companions. Their hearty reception on the part of the commons was the best argument that could be found to convince the other *curés* that they would not only be safe, but that they were highly regarded, and that the best project of conciliation was that all the deputies of the three orders constitute themselves in one assembly.³ The step found imitators, for even on the next day, June 14, six other *curés* presented themselves with their cre-

¹*Procès-verbal*, I, 28-29; Biauzat, II, 110; *Journal des états-généraux*, I, 74, 75.

²Biauzat, II, 110. See also note. Duquesnoy, I, 91: "Ces curés ont été applaudis avec transport. Ces trois hommes ont surement une grande force de caractère." *Revue de la révolution*, XII, *Documents inédits*, 57, 58.

³Duquesnoy, I, 91; *Journal des états-généraux*, I, 75. One of the *curés* was even asked to assist in the verification of credentials.

dentials¹ and were equally well received. One of the new comers, Dillon, spoke in behalf of all. He said that he regretted much that they had not come with their three colleagues, whose intentions they had not known. "Being convinced," he continued, "that our credentials ought to be verified by all the representatives of the nation, we come, gentlemen, in the hope of seeing at last the termination of our unhappy situation," division and inactivity. "Convinced that the union of the three orders alone can bring about the happy results which the nation awaits with the greatest impatience, we announce to you, gentlemen, that it was this most ardent desire of establishing union that brought us here." On June 15, three more *curés* presented their credentials. Two of them spoke. Marolles said:² "Gentlemen, since the opening of the states general, my heart has been with you. In a chamber that has remained isolated, I have fought for your interests, interests which are also ours and those of the whole nation. I come here, gentlemen, to announce this truth boldly and to give recognition by my action to the indispensable necessity of common verification of credentials in a *national assembly*. I submit my credentials to your examination. It is in this document that you will find the evidence of the right of your co-laborer to assist in the important work of the regeneration of the state; in my conduct you will find the principles and the tender affection of a brother. If my example is not followed by a great many, you will certainly allow me to return to the chamber of the clergy, where the defense of your cause will demand my presence."

Such words and such action as those of the twelve *curés* during these three days cheered and animated the commons in their forward course. They certainly inspirited the debates of June 15 and June 16 and gave additional force to the bold decrees of June 17. The news of the union of the *curés* with the deputies of the third estate spread at once among the public, and the admirable effect that was produced in favor of the commons reacted in turn upon the assembly. The decisive step, together with this

¹*Procès-verbal*, I, 80-82; *Journal des états-généraux*, I, 83-84; Duquesnoy, I, 95; Biauzaat, II, 116; *Revue de la révolution*, XII, *Documents inédits*, 110.

²*Procès-verbal*, I, 84, 85, 87-89; *Journal des états-généraux*, I, 87.

partial conquest, stirred up Paris, which at once reinforced and encouraged the commons in their course of constituting themselves.¹

The roll-call of the deputation was finished on June 13. A general request was made for all those who had been omitted to present their credentials.²

The credentials and the *procès-verbaux* of the various elective assemblies that had been received were distributed among the twenty bureaux. The bureaux were instructed to meet at four o'clock in the afternoon of June 13.³ Now, since the commons had commenced to organize themselves, everyone worked with greatest speed, for by eight o'clock in the evening the bureaux announced that they were ready to report to the general assembly. The report was terminated on June 14 and the verification of credentials was thus, in a general way, achieved.⁴ The commons, fearing they might be stopped in the work of organizing themselves, accepted almost all the credentials without raising the question of their validity. A committee was to be appointed, after the organization of the assembly, to examine contested credentials.⁵ All the steps preliminary to organization had now been taken and the commons were ready to constitute themselves. True, with the exception of the few *curés*, the deputies of the clergy and of the nobility had not joined them and had not presented their credentials for common verification, but the commons were now in a position to apply the principle that those deputies whose credentials were verified in the general hall represented the na-

¹Biauzat, II, 111. Young (entry of June 13) says that the three *curés* from Poitou "were received with a kind of madness of applause; and this evening at Paris nothing else is talked of." See also entries on June 14 and 15. *La révolution française*, XXIII, 529, 532-35.

²*Procès-verbal*, I, 38-40.

³*Procès-verbal*, I, 54; Duquesnoy, I, 92; Biauzat, II, 111, 112; *Revue de la révolution*, XII, *Documents inédits*, 58.

⁴Duquesnoy, I, 92: "Il n'y a qu'un petit nombre de difficultés, chacun ayant le bon esprit de sentir que ce n'est pas là le moment d'être minutieux et qu'il faut accélérer la marche." *Procès-verbal*, I, 55-83; *Revue de la révolution*, XII, *Documents inédits*, 109, 110.

⁵For the verification of credentials, see the study of M. Brette, *La vérification des pouvoirs à l'assemblée nationale*, in *La révolution française*, XXV, 413-36, 504-26; XXVI, 26-52.

tion and they should therefore constitute themselves as a national assembly. Biauzat proposed a resolution to this effect, not to be passed in that session, but for the purpose of allowing the members to consider the subject until the next day.¹ He suggested that the deputies whose credentials were just verified should declare themselves "*Assemblée légitime des représentants connus de la nation*; and the assembly orders that all other persons who pronounce themselves deputies, whether of the clergy, of the nobility, or of the commons, and who wish to be recognized as representatives and to obtain a seat in the assembly, must first submit their credentials for common verification."

The debate on the subject of the constitution of the assembly did not begin, however, until the following morning, June 15. It was then that Sieyès presented the second part of the plan that he had announced on June 10. It had been carefully discussed outside the assembly for at least a week, not only by the Breton deputies and their friends, but also by the other deputies of all three orders and by the general public.²

III

In the evening of June 15, Arthur Young wrote: "This has been a rich day, and such an one as ten years ago none could believe would ever arrive in France; a very important debate being expected on what, in our house of commons, would be termed the state of the nation. . . . At Versailles by eight in the morning, we went immediately to the hall of the states to secure good seats in the gallery; we found some deputies already there, and a pretty numerous audience collected. The room is too large; none

¹Biauzat, II, 116.

²Duquesnoy, I, 98. Duquesnoy quotes an extract from the speech of Crénières, who, as well as Mirabeau, mentions the fact that Sieyès' motion was known beforehand. See also the explanation of Sieyès at the end of his motion of June 10. *Récit*, 104; Biauzat, II, 102-3; *Journal des états-généraux*, I, 86, 87; *Revue de la révolution*, XII, *Documents inédits*, 111. The *Courrier de Provence* (*Lettre X*, 4) says that Sieyès' motion and speech made a deep impression, "particulièrement sur les députations de diverses provinces, qui avaient déjà, depuis plusieurs jours, connaissance de la motion même, et y avaient donné d'avance la plus haute et la plus entière approbation."

but stentorian lungs or the finest, clearest voices can be heard; however, the very size of the apartment, which admits two thousand people, gave a dignity to the scene. It was, indeed, an interesting one. The spectacle of the representatives of twenty-five millions of people, just emerging from the evils of two hundred years of arbitrary power and rising to the blessings of a freer constitution, assembled with open doors under the eye of the public, was framed to call into animated feelings every latent spark, every emotion of a liberal bosom."¹

It was again Sieyès who opened the discussion. He proposed that the assembly constitute itself as the assembly of the representatives known and verified of the French nation. While the title was somewhat ambiguous, the wording of Sieyès' speech and motion was clear and direct. In the introductory remarks, he reviewed the events which had followed the resolution of June 10.² The assembly had decided to constitute itself. To this end it had invited the deputies of the clergy and of the nobility to unite with them and to take part in the organization. The invitation had not been accepted. The credentials of the deputies of the commons had subsequently been verified, and it was therefore now necessary for the assembly to constitute itself as an active assembly. Sieyès laid down certain principles and drew inferences from them. He enumerated various titles, but found inconveniences in all of them. After deciding in favor of *Assemblée des représentants connus et vérifiés de la nation française*, he presented his motion, or rather series of motions:

"It has been proved by the result of the verification of credentials that this assembly is already composed of the representatives sent directly by at least ninety-six hundredths of the nation.

"Such a number of deputies must not and can not remain idle because of the absence of deputies from several *bailliages*, or from several classes of citizens; for those absent ones who have been invited to come into the national hall can not have the right to

¹Young, 163; Biauzat, II, 120: "Remarquez qu' heureusement nous admettons 8 à 1200 ouvriers à entendre le développement de nos vues pour le bien public." Duquesnoy, I, 65-66, 101, 104; *Journal des états-généraux*, I, 86, 87.

²*Courrier de Provence, Lettre II.*

prevent those who are present from exercising the whole of their powers, especially when the exercise of these powers is an imperious and pressing duty.

“Moreover, since it pertains only to those representatives whose credentials are verified to concur in and to express the national wish, and since such representatives are all in this assembly, it is furthermore indispensable to conclude that it is the business and duty of this assembly, and of this assembly alone, to interpret and to carry out the general wish of the nation. No other chamber of deputies, by mere presumption, can take away any of this power of deliberation. Lastly, between the throne and this assembly no veto, no negative power, can exist.

“The assembly declared, therefore, that the common work of the national restoration ought to, and necessarily must, be commenced without any delay by the deputies present and that they must and shall follow this work without any interruption and without any interference.

“The title, *Assemblée des représentants connus et vérifiés de la nation française*, is the only title which is appropriate for the assembly in the actual state of affairs, the only title which it wishes to adopt, inasmuch as it will never give up the hope of bringing into its midst all the deputies now absent. It will not cease to invite them, individually as well as collectively, to fulfil the obligation which is laid upon them, to take part in the holding of the states general. At whatever moment the absent deputies may present themselves during the session which is now beginning, the assembly declares in advance that it will receive them with joy and that it will urge them, after the verification of their credentials, to share with them in the great work which shall result in the regeneration of France.”¹

This motion made a great impression upon the assembly.² It

¹*Procès-verbal*, I, 89; *Journal des états-généraux*, I, 88-90; *Courrier de Provence*, *Lettre XI*, 3-6; *Duquesnoy*, I, 95, 96; *Biauzat*, II, 116, 117; *Revue de la révolution*, XII, 111, 112. In the first paragraph of the motion, *L'assemblée délibérant après la vérification des pouvoirs, reconnaît* was substituted for *Il est constant par le résultat de la vérification des pouvoirs*. With this exception the first four paragraphs of the motion agree verbally with the resolution. The last or fifth paragraph is expanded somewhat.

²*Ibid.*

embodied principles for which the third estate had so eagerly striven, and expressed, therefore, a natural, logical, and necessary step in advance of the previous progressive movement of the assembly. Sieyès' motions of June 10 and of June 15, linked together, formulated an important event in the movement towards the realization of the idea of popular sovereignty. They expressed the theory of the rule of the majority as against the privileges of classes; vote should be by head and not by order. Although it was the great desire of the commons to have the deputies of the clergy and of the nobility meet with them in the general assembly, yet since this object had so far not been obtained because those deputies refused to present themselves in the common hall, and since further waiting and delay was regarded as hazardous to the nation and as nullifying the performance of the duties of the deputies of the third estate, the assembly decreed that it alone would begin the work of national regeneration and restoration. First and chief of this work was the making of a constitution. By this motion, the assembly declared that it would still continue to work for the union of the three orders, but if the two orders should persist in their demand for separate assemblies, their powers should be null. The assembly alone should represent the nation; between the throne and the assembly there should be no veto power nor any right of interference; the king and the assembly should govern France. If the deputies of the clergy and of the nobility wished to exercise any power at all and take part in the work of the states general, they must come into the general assembly, the decisions of which should be controlled by the wish of the majority.

This motion proposed by Sieyès, and generally accepted by the assembly, was an arbitrary one, though from the point of view of the third estate such a resolute and even arbitrary step was necessary. By this time, urged on by opponents and partisans alike, and especially by their own patriotism, the desires of the commons had grown into imperious public demands. The states general was composed of the representatives of the three orders of France, but during these eventful days, the assembly reached such a point in the growth of its interpretation of its powers and duties, that

it alone assumed the authority of deciding the powers and the organization of the national assembly; it decreed that instead of a states general there should be a national assembly in which the orders would be fused. And the statement that the assembly should not allow any interference in its work nor any veto power which was now directed against the deputies of the other orders, was a few days later made absolute. It was expanded so that it included the king himself. Thus the assembly considered itself as possessing the sovereign power in France. Henceforth there should not be a government by divine right of kings, but a government by divine right of the people.

Certain deputies developed in their speeches these ideas of national sovereignty which were soon after put into practice. But what was, it may well be asked, the meaning and the significance of such a lengthy discussion? At least two problems confronted the commons in this act of constituting themselves, namely to determine and set forth the powers, the principles, and the policy, which they should assume as an assembly and to discover how far public opinion would follow and support the assembly in its decrees. Sieyès answered the first question by proposing that the assembly should assume all the representative power, all the power of the states general, that the privileged classes should have no independent existence, but that they should be swallowed up in this newly created nation. In dealing with the second question the use of diplomacy was thought more expedient. The motion defined the existence and the powers of the assembly, and the title, to which the public would chiefly look, could be easily modified as the principle for which the assembly stood, namely, a national assembly, was in the eyes of the public realized. What but that hindered Sieyès from proposing the title, national assembly, which public opinion had already consecrated? This formula had repeatedly been used before, and even by the king and the ministry. Sieyès had already proposed it in the conclusion of his famous monograph, *Qu'est-ce que le tiers état?* Mirabeau had used the expression continuously both in his private and public letters and in his speeches, and other deputies had employed it in their writings. Since the opening of the states gen-

eral various deputies had made use of it in their writings and their speeches. *Assemblée nationale* had appeared even in the king's own letter to the three orders on May 28. The conciliatory commissioners of the three orders had repeatedly used the designation in their discussions, and the commissioners of the clergy and the nobility had raised no objection to its frequent appearance in the *procès-verbal des conférences*. True, the phrase had been used in the sense of the states general, but did not the motion declare that the assembly should exercise the whole of the powers of the states general?

The title which the assembly was to adopt in constituting itself was considered a sort of written constitution for the assembly. The title ought, in the fewest words possible, to express and circumscribe the composition as well as the powers of the assembly. It was the phrase, *connus et vérifiés*, of the title, *Assemblée des représentants connus et vérifiés de la nation française*, that was the descriptive and limiting feature of this title. It was also this phrase that, from the standpoint of the assembly, did not give any independent legal existence to the deputies of the clergy and of the nobility. And since these deputies could have no separate existence as orders—the majority, the commons, had decided against it—it was thought that they would finally join the assembly and take part in the work of the states general. The union of all the deputies of the three orders in one assembly would destroy the significance of the phrase, *connus et vérifiés*. And to expunge these words would leave the title entirely synonymous with that of national assembly. Again, the credentials had been verified by the deputies of the *tiers-état*, so *nation Française* stood for the assembly of the deputies of the *tiers-état*, or, expressed in the language of Sieyès' resolution adopted on June 10, *L'assemblée des communes*. This included, of course, all the deputies of the clergy and of the nobility who had already presented or who would yet present their credentials to the assembly. And *nation française* stood for *assemblée de la nation française*, or *assemblée des députés*, or *des représentants de la nation française*. To have substituted any one of these phrases for *nation française* would have made the title different only in expression

but not in meaning. And with the omission of the words, *connus et vérifiés*, the title would have expressed nothing more nor less than the name national assembly.

And why should the assembly accept the entire proposition of Sieyès as favorably as it did, when so many radical members were present? Why was the short, the suggestive, the well-known title, national assembly, not proposed immediately after Sieyès left the floor, and why should it be passed over as unnoticed when it was proposed after a whole day's discussion? The leaders evidently avoided it, and the great majority of the members had complete confidence in Sieyès and his tactics. For several days previous to June 15, a large number of the deputies had known of the plan of Sieyès, and they had given, in advance, their hearty support to it.¹ The projects of Sieyès were prepared before June 10, for after the reading of his motion on that day, he had referred to them. He had explained to the assembly that the question of constituting itself could only be taken up after the completion of the verification of credentials. Also the personality and popularity of Sieyès gave weight to the proposed title. He was, for the moment, the acknowledged leader of the assembly;² his ability and great devotion to the cause of the third estate were well known; his motion of June 10, which had so entirely met with the desires of the commons, had given him, already famous, still greater prestige. The vast majority of the deputies, including those from Brittany, favored both his motion and his title. The assembly was forced to be arbitrary in its decision. It had no legal nor customary right to constitute itself as the only assembly and to declare against the veto power of the other orders, but in taking such a resolute step, Sieyès desired to give as little

¹*Courrier de Provence, Lettre XI, 4; Duquesnoy, I, 98: "Si favorable à ceux à qui les motions ont été communiquées d'avance, et si cruel pour ceux qui, étrangers à tous les partis, à toutes les coalitions, ne connaissent de projets que ceux qui se forment dans cette assemblée."* Duquesnoy took this extract from Crènière's speech made on June 16. *Journal des états-généraux, I, 86-87.* All the deputies awaited the moment of constituting themselves and "s'y étaient préparés, et depuis quelques jours les motions étaient déjà fortes, et ce fut à les lire que l'on employa cette séance" of June 15.

²Dumont, 52-54.

affront to the other orders and to cause as little public opposition as possible. A longer title did express better the actual position of the assembly and was therefore preferable to a bolder title which would cause more antagonism. Not only the king and the court, not only the privileged classes, especially the deputies of the clergy and of the nobility, not only the public even, but the deputies of the commons themselves had to be reckoned with. Some of the deputies were still more or less timid and hesitating. It is true that most of the timid ones had been won over by the evening of June 14, but it was still a question just how steadfast they would be in action. In order to be successful, all the deputies of the assembly had to stand together and be ready for the worst consequences. Sieyès, as well as other leaders, realized the seriousness of this step. But the moral strength of the assembly had been fully tested during the sessions of June 15, 16, and 17, and the commons had been sufficiently supported by encouragements from the outside to justify it in the course that it followed.¹ The lengthy and even violent debates that arose were due not to any fundamental difference in opinion among the deputies, not to any enmity among the members, but rather to the many plans prepared beforehand. The debates showed the interest and the strength of the assembly in this question of constituting itself rather than division and weakness. The deputies had their hearts set on success, and their enthusiasm inflamed the public.

Concerning the animated debate which followed the reading of Sieyès' motion, Mirabeau wrote:² "The session of the fifteenth has up to the present been one of the most remarkable, both because of the gravity of the subject and for the extent of the discussion and the number of persons who have taken part." Many spoke in favor of Sieyès' motion; others presented motions and titles which they had prepared. It was thought by some that the assembly did not represent the entire nation and all its interests, and a motion was presented to constitute itself as an

¹*La révolution française*, XXIII, 533, 534.

²*Courrier de Provence*, Lettre XI, 3.

*assemblée de représentants de vingt-cinq millions de Français.*¹ *Le point du jour* of June 19, 1789,² says: "M. Barrère de Vieusac, député de Bigorre, proposed *représentants de la très-majeure partie des Français dans l'assemblée nationale*, and Chérest quotes Barrère as proposing *représentants légitimes de la majeure partie des français ou de vingt-quatre millions d'hommes dans l'assemblée nationale.*"³

The speech of the day was delivered by Mirabeau.⁴ Arthur Young, who heard him, says: "Mons. de Mirabeau spoke without notes for near an hour, with a warmth, animation, and eloquence that entitle him to the reputation of an undoubted orator."⁵ Mirabeau advocated the title, "Representatives of the French people." We learn from his journal and from his tremendous exertion during the debate that Mirabeau considered the matter of the title of the very highest importance. He began by saying that he had been afflicted for several days with a very disagreeable fever, which was attacking him at that very moment and weakened him greatly. He begged his audience, therefore, to be very quiet and attentive; their sympathy would furnish him strength during his discourse; he wished to present a number of resolutions upon which he had meditated a long time and which he had drawn up when he was not suffering as he was at present.⁶ By way of introduction, he spoke of the advantages to the commons of having waited so long before constituting themselves. Time

¹*Courrier de Provence, Lettre XI, 7; Duquesnoy, I, 96: "Représentants de 26 millions d'hommes, idée vague, abstraite, dont le résultat serait de nous laisser ce que nous sommes et ne nous donnerait aucun droit à la législation." Biauzat, II, 117.*

²*Le point du jour*, no. I, 1.

³Chérest, III, 151; Chérest, III, 148, 150, 151, 152, states that the "*Procès-verbal des séances de l'ass. nationale*, in - 4°, t. I, 3° partie, Annexes, p. 13 et suiv." contains the motions of Sieyès, Barrère, Mirabeau, and Mounier. The original octavo edition of the *Procès-verbal* has only the motion as finally carried on June 17 (I, 2-4).

⁴*Courrier de Provence, Lettre XI, 7-30.* For Mirabeau's speech and motion, see also Biauzat, II, 117; Duquesnoy, I, 96; *Journal des états-généraux*, I, 90, 91; *Revue de la révolution*, XIII, *Documents inédits*, II; Dumont, 61, 62.

⁵Young, 164.

⁶*Courrier de Provence, Lettre XI, 7-8; Journal des états-généraux*, I, 90-91: "M. de Mirabeau presented another plan which is perhaps more

had been given for the spirits to calm themselves and for the friends of the public welfare to come to the support of justice and reason. The deputies had shown great moderation and courage. "However, time is gliding away, the pretensions, the usurpations of the two orders have increased; your wise moderation has been taken for weakness; one (the opposite party) has conceived the hope that ennui, anxiety, public misfortunes, constantly increased by almost unheard of circumstances, would force you to some pusillanimous or rash step. Behold, this is the moment for reassuring yourselves, and for inspiring your adversaries with discretion, with fear, I almost said, with terror, in showing from your first operations foresight and ability joined with the gentle firmness of reason."

Continuing, Mirabeau indicated how easy it was just now to take very radical resolutions, especially if urged on by a passionate speech. He flattered the assembly and reproached the upper orders.¹ The private interests of the orders were opposing the general interests. The orders wished to keep the nation divided into two classes, "oppressors and oppressed; they exert themselves to perpetuate a sham constitution according to which a single word pronounced by one hundred and fifty-one individuals can check the king and twenty-four million men;² a constitution according to which two orders that are neither the people nor the prince will make use of the second (the king) in order to oppress the first, of the first (the people) in order to frighten the second, and of circumstances in order to reduce everything which is not they to nothingness." But all these truths teach them "the

noble and great" than the one of Sieyès, "not more prudent and wise, however." "Il parla pendant près d'une heure: le patriotisme qui l'animait ne lui permit pas de penser à la fièvre qui le travaillait dans ce moment, ou plutôt il triompha de son mal pour ne s'occuper que des maux de la patrie. Jamais il ne parla avec tant de feu, tant d'éloquence; jamais il ne dit des vérités aussi dures, aussi énergiques à la noblesse et au clergé." See also *Lettres de Mirabeau au Major de Mauvillon*, 467.

¹*Courrier de Provence*, Lettre XI, 9: "Vos droits sont si évidents, vos réclamations si simples, et les procédés des deux ordres si manifestement irréguliers, leurs principes tellement insoutenables, que le parallèle en serait au-dessus de l'attente publique."

²By one hundred and fifty-one, Mirabeau means the majority of the deputies in any one of the chambers of the clergy and of the nobility.

necessity of wisdom and perseverance in order to arrive at a constitution which shall draw us from so deplorable a state of things, and of proportioning our emulation and our efforts to the difficulties of this enterprise, sublime, no doubt, but simple, and which demands only the cooperation of statesmen¹ and the support of their wishes; for it is to the development of reason that nature has intrusted the eternal destiny of societies; and it is reason alone which is able to make laws that are binding and durable;² and it is reason and law alone that can govern man in society.”

Mirabeau's wise guidance is seen in this address. The assembly should advance, but towards a goal that it could reach, that could not escape it. It was forced to take a firm forward step now. All peaceful means were exhausted, the conferences were closed. “It is necessary to constitute ourselves; we all agree as to that; but how? with what powers, with what title?”³ States general was improper “for it supposes three orders, three estates, and certainly these three orders are not here. But who will propose to us to constitute ourselves with some title synonymous after all with that of states general? I shall always ask: will you have the sanction of the king? And how can you dispense with his sanction? May the authority of the monarch be in abeyance for a moment? Is it not necessary that he should concur in your decree were it only that he should be bound thereby? And when it is denied, against all principles, that his sanction is necessary in order to make binding every act outside of this assembly, will he accord to subsequent decrees his sanction?”⁴

¹“Lumières.”

²*Courrier de Provence, Lettre XI, 12.* “Obligatoires et durables.”

³*Ibid.*, 199. “Il faut nous constituer, nous en sommes tous d'accord; mais comment? Sous quelle forme, sous quelle dénomination?”

⁴*Courrier de Provence, Lettre XI, 13:* “Nous proposerait-on de nous constituer sous quelqu'autre dénomination synonyme après tout de celle d'états-généraux? Je demanderai toujours: aurez-vous la sanction du roi? Et pouvez vous vous en passer? L'autorité du monarque peut-elle sommeiller un instant? Ne faut-il pas qu'il concoure à votre décret, ne fût-ce que pour en être lié? Et quand on nierait, contre tous les principes, que la sanction fût nécessaire pour rendre obligatoire tout acte extérieur de cette assemblée, accordera-t-il aux décrets subséquents une sanction dont on avoue qu'il est impossible de se passer, lorsqu'ils émaneront d'un mode de constitution qu'il ne voudra pas reconnaître?” *La révolution française*, XXIII, 533.

This part of the speech was a criticism of the motion of Sieyès. Mirabeau continued: "Are you sure that you have the support of your constituents?" The people did not care for metaphysical discussions. They must be considered more than they had been because they were of the greatest importance. "They are the development and the consequence of the principle of national representation, the basis of every constitution." The people did not care for a system of rights and theory of liberty, but they wanted relief from present oppressions. The people in time would demand more, but it was necessary for the assembly to adapt itself to circumstances. The assembly needed for its support the irresistible power of public opinion, public confidence, the unlimited devotion of the people. But public opinion was unstable, it was very easy to persuade it to sell the constitution for bread. "We are all here," he said, "under the form of convocation which the king has given us. Without doubt you can and ought to change it, when you become an active assembly; but can you do it today? Can you do it before being constituted? Can you do it in the act of constituting yourselves? By what right do you today pass the limits of your instructions? Are you not called as estates? Has the provisional legislator not supposed three orders, although he has called them in one single assembly? Your mandates, your *cahiers*, do they authorize you to declare yourselves *assemblée des seuls représentants connus et vérifiés*? And you can not say that the case in which you find yourselves has not been foreseen. It has been only too clearly, for some of your mandates instructed you to withdraw, if it should be impossible to arrive at a deliberation in common, but there is not one which authorized you to call yourselves *les seuls représentants connus et vérifiés*.

"And if you do run aground, if the king refuses you his sanction, if the two orders protest, if you are without his authority, what then? Dissolution or prorogation. . . The evident consequence of which will be the unbridling of all the vengeance, the coalition of all the aristocracies, and hideous anarchy which always leads to despotism. You will have pillages, you will have massacres; and you will not even have the execrable honor of a civil war." Sieyès' title was unintelligible and not dignified and

would need to be changed after the union of the orders. "Do not take a title which frightens. Choose one which no one can contest with you, which, more agreeable, and not less imposing in its plenitude, is suitable at all times, is susceptible of all the development which events will permit, and which may, if necessary, serve as a lever, as it were, which will assist in establishing the national rights and principles.

"Such is, in my opinion, the following formula: *Représentants du peuple français.*"

No one could dispute this title with them and it was capable of the greatest development. The other orders would be forced to adhere to it. If they should refuse, "we will pronounce default against them, and then all the world will be able to judge between us." But to constitute the assembly, to give to it a title, was not enough. "It is necessary to establish our principles; the rational and intelligent principles, which up to the present have directed us. . . . It is necessary to show why and how we are going to enter upon our active career;" that the orders were the cause of division, that the orders had no veto, no right to take separate resolutions from that of the assembly. "It is necessary to announce our intentions and our views; it is necessary to assure, by a course equally wise, legal, and progressive, the soundness of our measures, to maintain the resources of the government, in so far as they may be made to serve the national welfare, and to present to the creditors of the state the hope of this security which they desire, which the national honor requires us to offer to them, which is the great and first object of our convocation and of our wishes.

"It is to this end that have been drawn up the resolutions which I shall have the honor to read to you." After an introduction in which he presented a resumé of the events since June 10, Mirabeau read eight resolutions.¹ In these resolutions the words, *national assembly*, occurred again and again. The national assembly convoked by the king was composed of the deputies of the three orders; the deputies, of whatever order they were, had an individual and common right to sit together in the national as-

¹*Courrier de Provence, Lettre XI, 15.*

sembly. After the refusal of the upper orders to meet with them, those deputies whose credentials had been verified on June 13 and 14 should declare that the other deputies could receive legal authority only by presenting their credentials to the national assembly and by their confirmation in the national assembly. The deputies whose credentials were verified were authorized to organize and constitute themselves, "and they do so by the present resolution, with the powers and the title of *assemblée des représentants du peuple de France*; they enter at once into activity as such and proceed consequently to the election of a president and other necessary officers. . . . Resolved that by constituting themselves as an active assembly and with the powers of *assemblée des représentants du peuple de France*, the assembly does not intend to put any obstacles in the way of the much-desired union of the other deputies with the *représentants du peuple dans l'assemblée nationale*."¹ "Resolved that the *assemblée des représentants du peuple de France* will occupy itself, without any relaxation and with all the speed of which it is capable, with plans in order to aid the great and noble efforts of the king and to satisfy the expectation of his people for the welfare of the kingdom, by communicating directly to his majesty various measures which he shall esteem most proper to fill this end; but it shall never recognize in the deputies of the privileged classes, no matter how many there are, any veto, that is, any right of opposition by separate deliberation taken outside of the national assembly to anything that shall be judged necessary for the general well-being of France."

"Whereas any taxes, that is to say, any levy of funds for the public needs, under whatever form or name the levy may be established, may not legally exist without the express consent of the people by its representatives in the states general and only

¹*Courrier de Provence, Lettre XI*. Resolution four reads: "Résolu qu'en se constituant en la forme et qualité d'assemblée des représentants du peuple de France, l'assemblée n'entend point mettre d'obstacles à la réunion si désirée des autres députés avec les représentants du peuple dans l'assemblée nationale, qu'elle sera toujours prête à les recevoir aussi-tôt qu'ils témoigneront le desir de se joindre à eux dans l'unique qualité que leur assigne la raison et l'intérêt national, et de se faire légalement reconnaître en l'assemblée nationale, par la vérification de leurs pouvoirs."

for such time as they shall judge it proper; whereas, again, this principle, sacred in every constitution in which the people is counted for something, has been acknowledged even by his majesty himself, by the sovereign courts, and by the unanimous wish of the people, as one of the essential bases of the monarchy; and whereas, finally, not one of the existing taxes is legal, either because of its origin or because of its extension since its origin, the *assemblée des représentants du peuple* declares them all null and legally suppressed." The people had not given their consent to the taxes, but since the public credit had to be maintained, since money was needed, and since it would take time to establish a new order of things, "the assembly consents, provisionally, in the name of its constituents," to the existing taxes; but they should be legally collected only during the time of that session of the states general.¹

"Resolved that as soon as the principles, according to which the regeneration of the kingdom shall be effected, are legally determined and established, the rights of the people assured, the basis of a rational and satisfactory constitution laid down and established and secured by the protection of the legislative power of the king and of the national assembly, the *représentants du peuple de France* will take all the necessary steps toward securing the creditors of the state; that the debt of the king, which will then become that of the nation, may have henceforth for security even the honor and trust of this nation and the surveillance of its representatives, the organ and depository of the sacred treasure of public credit."

The eighth resolution provided that the above resolutions, together with an address expressing the motives for the measures taken since the former address,² be presented to the king. Mirabeau then continued: "You have heard, gentlemen, the series of

¹One of the main motives in calling the states general was to establish order in the finances. This resolution was therefore an important one. It expressed an innovation. It is referred to by the deputies who informed their constituents in regard to the doings of the assembly. We shall see that although Mirabeau's title was rejected his resolutions were in substance adopted on June 17. Biauzat, II, 117; Duquesnoy, I, 96; Young, 164.

²*Procès-verbal*, I, 41-48. The address of June 13.

resolutions by which I think it necessary to support the title under which I propose to you to constitute our assembly." He made a final plea for his title and showed its advantages over that of Sieyès.

Mirabeau's speech was listened to with sustained attention.¹ It was well heard all over the hall and was much applauded. A little later, however, it was violently attacked.

Another motion of which record has been made was that of Mounier. He proposed that the assembly constitute itself as an *assemblée légitime des représentants de la majeure partie de la nation, agissant en l'absence de la mineure partie.*² Mounier opposed the other titles as being dangerous and inexact. He supported in his turn several of the principles laid down by Sieyès and Mirabeau. His motion at first gained some favor; Barnave was one of the principal supporters of it.³ He "defended this motion with much art, much ingenuity, in trying to show that it was conciliatory and similar to that of the Abbé Sieyès. He *combated ingeniously the title of représentants du peuple.*"

Rabaut de Saint-Etienne favored Mirabeau's title, "*assemblée des représentants du peuple de France.*"⁴ His motion contains such expressions as the assembly "ought to be one because the nation is one"; consequently "all the operations and measures of the assembly, both preliminary and subsequent ones, ought to be one also"; all the "deputies have an interest and a right to know one another"; "no one ought to be considered deputy of a bailiage, of a sénéchaussée, of a city, nor of a particular class of the French people." Only those whose credentials were verified in common were deputies. In a series of resolutions which he pre-

¹*Courrier de Provence, Lettre XI, 30; Young, 164.*

²*Courrier de Provence, Lettre XI, 31-32; Journal des états-généraux, I, 91-92.* Both give the motion in the same words. Young, 164, says, "the legitimate representatives of the majority of the nation." Biauzat, II, 117, says that a fourth motion was made, "tendant à nous faire déclarer représentants de la plus grande partie de la nation." He thinks this motion was made by Le Meunier (Demeunier). He ascribes to Mounier the title, "Représentants de la nation."

³*Ibid.; Oeuvres de Barnave, I, p. XLI.*

⁴*Journal des états-généraux, I, 92-95; Courrier de Provence, Lettre XI, 32.*

sented and in which the above ideas are embodied, separate verification of credentials and separate assemblies of deputies were declared invalid and the measures of the assembly of the representatives of the French people made subject to the king's veto power only. In five further resolutions which he wished passed as decrees, Rabaut proposed that the assembly "declare all the existing taxes suppressed" for they had been established without the consent of the nation; "it creates them anew," however, only for the period of the present session of the states general. In case the present states general be dissolved without having freely consented to the taxes, "the taxes shall remain suppressed." The resolutions promised that as soon as the assembly should be properly constituted provision should be made for the national debt; that a loan should be made to provide for the current expenses of the state; that the present decision be taken to the king, that the motives of the action of the assembly be explained to him, and that he be asked for his sanction. He advised further that Necker be asked to make an estimate of the financial needs of the government. Young says that all propositions "were well approved, except the loan, which was not at all to the feeling of the assembly."¹ Biauzat states that Rabaut explained that he understood by this word (*peuple*) all Frenchmen, with the exception of the nobility and of the clergy. M. de Mirabeau, on the contrary, claims to comprehend in this word (*peuple*) all the French in general.²

Biauzat developed his motion of the day before.³ According to him, Treilhard proposed that in order to deliberate prudently

¹Young, 165; *Journal des états-généraux*, I, 95-96; Duquesnoy, I, 97: "Rabaut de Saint-Etienne, en adoptant la motion de Mirabeau, n'a pas rougi de voter un emprunt." Many cahiers had contained instructions that no taxes or loans should be voted until after the constitution had been put into practice.

²Biauzat, II, 117; *Journal des états-généraux*, I, 95.

³Biauzat, II, 117: "Etant à mon tour de parler, car nous sommes appelés sur le rôle fait à mesure des demandes de la parole, j'ai développé ma motion d'hier." Thus far the order of the principal speakers at least may be ascertained. But after the motion of Rabaut de Saint-Etienne the order can not be established with the sources of information at my command. Gaultier de Biauzat states that he himself was followed by Mounier who presented a sixth motion, while our other sources place Mounier immediately after Mirabeau.

in every important matter, an interval of twenty-four hours should intervene between the motion and the discussion, and preparatory observations should be first listened to in the bureaux.¹ And according to the *Journal des états-généraux*, Tronchet read an article from the *cahiers* of Paris in support of his demand for two considerations of every really important question before its adoption.² The object of such demands as these was always either to postpone action altogether or else to give every member an opportunity to speak upon all motions after each reading and thus prevent the assembly from passing any precipitous or dangerous measures.

Judging from the order of the speakers, so far as it may be determined, it seems that this speech closed the morning session. But there was another session in the evening of June 15 in which the discussion was continued. More than thirty persons spoke during the sessions of June 15 on the various motions.³ Young says: "More than once today there were more than one hundred members on their legs at a time, and Mon. Bailly absolutely without power to keep order."⁴ Because of this confusion, an imperfect and incomplete account was kept. There occurred a great deal of repetition in the debates; men's minds tired of keeping a record.⁵

During the evening session both Mirabeau and Sieyès spoke again. Each developed his motion, each attempted to explain away the objections made to it and to show the fallacies of the

¹Biauzat, II, 117: "M. Treilhard, avocat au parlement."

²I, 96.

³*Courrier de Provence, Lettre XI, 33*: "Le débat de ces trois motions (the motions of Mirabeau, Sieyès and Mounier), attaquées ou défendues par plus de trente personnes, dans le premier jour, a prouvé que notre nation, quoique si long-temps étrangère aux délibérations publiques, est très-capable de saisir ce genre particulier, qui ne permet ni la précision de l'écrivain, ni la loquacité du barreau."

⁴Young, 165, 166. Young continues: "This arises very much from complex motions being admitted; to move a declaration relative to their title, to their powers, to taxes, to a loan, etc., etc., all in one proposition, appears to English ears preposterous."

⁵While we have a rather satisfactory account of the discussion of the morning's session held on June 15, the record of the evening session and the two sessions of the following day is very imperfect. Men either tired of taking notes or few new ideas were presented.

other motions.¹ Target spoke also: "It is certainly necessary to constitute ourselves, but when? Today. In what manner? As Sieyès has explained. The word *peuple* does not answer to our idea. Does it signify the commons? Then it says not enough. Does it signify the entire nation? That is too much. Choose a mean which, placed between the two extremes, will neither compromise our rights nor our principles."² We are the known representatives of the nation."³ Chapelier spoke also and again showed his boldness. He proposed that the phrase *connus et vérifiés* be dropped and that the title presented by Sieyès be changed to *représentants de la nation française légalement vérifiés*. This change indicated a step in advance; it brought Sieyès' title nearer the goal, national assembly. "This amendment was supported by several members and generally approved" by the assembly.⁴

Bergasse favored the motion of Sieyès, but accepted Chapelier's recommended change in the title.⁵ He explained the purpose of Sieyès in inserting *connus et vérifiés*, viz., "in order to calm our fears, also to inform the other two orders that, in taking the title which is proposed to us, we do not pretend to deprive them in any way of the power of representatives of the nation, and that we wish only to remain faithful to our principles, to the system which we have adopted in the common verification of credentials, the system which permits us to recognize as deputies of the nation only those who shall have consented to have their credentials verified in common with us." Bergasse thought that such fears were not well founded and that, therefore, the phrase *connus et vérifiés* was not necessary. The title *assemblée des communes*, even the title *représentants du peuple*, was not a proper one.

¹ Biauzat, II, 118; Duquesnoy, I, 97; *Journal des états-généraux*, I, 103; *Courrier de Provence*, Lettre XI, 37, note.

² Biauzat, II, 118; *Journal des états-généraux*, I, 98, 99; Duquesnoy, I, 97.

³ *Journal des états-généraux*, I, 98, 99. Target emphasizes the importance of the question under discussion: "Il faut décider avec prudence, mais avec célérité; et ce n'est qu'avec effroi que j'arrive à la discussion."

⁴ *Journal des états-généraux*, I, 102.

⁵ *Journal des états-généraux*, I, 100-2; Duquesnoy, I, 97. The *Archives parlementaires*, VIII, 114-18, claims to possess the entire speech of Bergasse. The extracts given in the *Journal des états-généraux* agree with it.

True, the deputies of the assembly were elected by the commons or the people and they had also to deal with this class very largely in their business as an assembly, but they were instructed by their constituents to prepare a constitution, and they had to take into consideration, therefore, all the interests of the nation, and Bergasse maintained that the most fitting title for such an assembly was *assemblée des représentants de la nation*. "Elected by the nation in order to organize the political system of the nation, your assembly can not constitute itself otherwise than as *assemblée des représentants de la nation*." Bergasse said that the objection found to this title was that it would wound the privileged classes and that it would end in alienating them, when the assembly had announced that it would never give up the hope of the union of all the deputies elected to the states general. "I answer, first, that even though such consideration were well founded, yet the principles which I have just developed are not less true, and when the making of a constitution is in question, it is not determined by considerations, but it is based upon principles.

"In the second place, I answer that it is wrong for you to fear that you would wound the deputies of the privileged classes. They certainly agree with you in principle; surely no one but a deputy of the nation can work in the interest of the nation; they certainly agree with you, for if they would consider themselves only as deputies of the clergy, or only as deputies of the nobility, they would have no right to occupy themselves with the totality of the interests of the nation, for example with the making of the constitution."¹

Bergasse proposed another amendment to the motion of Sieyès, namely: that as soon as the *assemblée des représentants de la nation* was constituted, a committee ought to be appointed for the purpose of setting forth the motives of the assembly in constituting itself in the manner that it had, and also of showing the necessity of vote by head, and the indivisibility of the states general. This statement should be presented to the king and should be made public.²

¹Bergasse, like the other principal speakers, repeated some of the ideas expressed by Chapelier in his motion of May 14.

²*Archives parlementaires*, VIII, 118; *Journal des états-généraux*, I, 101, 102.

Thouret favored Mounier's motion and spoke against the titles presented by Mirabeau and by Sieyès.¹ He said that if *peuple* stood for *plebs* the title admitted distinction of orders, but if for *populus*, "you increase the rights and the claims of the commons too much." He maintained that "it is necessary to constitute ourselves in such a manner that, when the clergy and the nobility have united with us, change in the constitution will be found unnecessary."²

"M. Malouet expressed himself with much force. He maintained with sound arguments that the assembly could take no other title than that of *représentants du peuple*."³ In supporting Mirabeau's title, Malouet made use of some of Mirabeau's arguments.⁴ He said: "I adhere to the proposition which proclaims us exactly what we are, *représentants de la majeure partie de la nation*, or *représentants du peuple*. . . To constitute ourselves a national assembly without reference to the clergy and to the nobility, will cause a disastrous schism which will produce the dissolution of the states general." The assembly should never recognize the separation of the orders, nor their pretensions of possessing a veto power. He favored, also, the proposal that an

¹*Journal des états-généraux*, I, 103. Biauzat (II, 118) states that the speech of Thouret influenced him to withdraw his motion. *Courrier de Provence*, Lettre XI, 36, 46, 47.

²After the union of the three orders, the phrase *représentants de la majeure partie de la nation* would certainly be no more applicable than the titles proposed by Sieyès and Mirabeau.

³*Courrier de Provence*, Lettre XI, 32-34. The motion of Malouet is given in a note on page 215. His speech as given in the *Moniteur* (I, 76-78) is found in the *Point du jour*, introductory volume, 384-90. The *Journal des états-généraux*, I, 104, 105, does not reproduce the speech or motion. It says that the deputies did not listen to his reading and Biauzat states (II, 118) that he was interrupted several times. The *Courrier de Provence* and the *Moniteur* do not agree.

⁴The speech of Malouet shows that he was a man of great ability. He was yet young and very ambitious. His forwardness and his readiness to take part in the discussions had made him many enemies. His seat had been contested. He was thought by some deputies to be in league with the court. He had on May 15 advised that, in order to persuade the deputies of the clergy and of the nobility to common verification of credentials, their property and social prerogatives should be guaranteed and that common verification should not prejudice the question of a single or separate chambers. See Biauzat, II, 33, 38, 39, 48, 63, 114, 115; Duquesnoy, I, 9, 10; 12, 23, 24; *Procès-verbal*, I, 73; *Journal des états-généraux*, I, 27-29.

address be presented to the king and to the public. The king's veto power was necessary. "May our assertion [of the right of the majority] become a law? Yesterday, today, we are still the deputies of the commons. May a simple expression of our will transform us into a national assembly? In this manner he further criticised the motion and title proposed by Sieyès, modified to *assemblée des représentants de la nation*. "What does the organization as *représentants de la nation* signify? What law authorizes it? Where is the sovereign will that has expressed this just and useful intention? Are we alone the legislative power? Are we able to supply it? Has the general will authorized you to act thus? Have your constituents instructed you to constitute yourselves in this manner? It is true, gentlemen, that you are more essentially the representatives of the nation than are the deputies of the clergy and the nobility; for the first elements of the social and political power consist in the national body which has appointed us. But instead of annihilating them [the orders] you put them into action against you, if you go beyond your powers." Sieyès' title was a direct criticism on the other orders. "This attack provokes instantly a defense, a resistance, a schism."

The eloquence and good sense of this speech did not influence the assembly. Its effect was negative; it even hurt Mirabeau's motion. Dumont says, speaking of Mirabeau's motion: "This motion, not very well understood at first, was not strongly opposed, but when Malouet, who passed for a ministerial, was seen to support it and was bringing the moderates to his way of thinking, the popular party in alarm commenced a violent attack on Mirabeau. The word *peuple*, at first thought synonymous with the word nation, was now placed in another light, as having been invented to form opposition with the nobility and clergy who were not the people and pretended to be above them. Invectives were not spared. Mirabeau was termed an aristocrat in disguise who had insidiously endeavored, by this title, to vilify the true representatives of the French nation. The tempest, increasing by degrees, seemed to burst with tenfold fury.¹ Mirabeau's mo-

¹Dumont, 73. Mirabeau was not trusted and was often accused of being sold to the court. See especially the letters of Duquesnoy.

tion was doomed, while that of Sieyès gained correspondingly in popularity. Young says: "All conversation on the motion of l'abbé Sieyès being accepted, yet that of Mirabeau better relished." Mirabeau's "character is a dead weight upon him."¹

The question was not decided during the sessions of June 15. "In all probability," wrote Young, "it will be unfinished even tomorrow, as the number that will speak on it is very great."² At ten o'clock in the evening, the assembly adjourned to nine o'clock the following morning.³

The leaders of the assembly had spoken during the sessions of June 15; several of them spoke again on June 16, but on this second day, for the most part, second-rate speakers discussed the question of organization.⁴ Camus favored Sieyès' motion and title as amended; he maintained that by constituting themselves as the *représentants de la nation française légalement vérifiés*, they were expressing "a simple fact, an authentic truth. You are the only verified representatives; why not publish it therefore in the face of the nation? And why speak to us of the sanction of the king, of his veto? Can his veto prevent that the fact which we shall proclaim, that the truth which we shall publish is always one and always unchangeable? Can his veto prevent us from

¹Young, 168.

²*Ibid.*, 166.

³*Procès-verbal*, I, 96; *Journal des états-généraux*, I, 106, states, "Il était près de onze heures." Biauzat wrote (II, 118) at nine o'clock the next morning: "L'assemblée n'a pas encore commencé, j'ai entrevu, dans les différentes groupes qui raisonnent en attendant, que la motion de M. l'abbé Sieyès passera, et sans restriction. Les Bretons, les Dauphinois, les Angevins et leurs adhérents, qui font capable depuis près d'un mois sur toute matière, épaulent ce système qui pourrait bien n'être pas généralement approuvé hors de chez nous. Cependant faudrait-il bien se référer à la majorité des voix, que l'on recueillera infailliblement dans aujourd'hui." *Courrier de Provence, Lettre XI*, 36: "L'assemblée ne se separa qu'à dix heures et s'ajourna le [au] lendemain à huit." *Revue de la révolution*, XII, *Documents inédits*, 112; "Les discussions . . . se sont prolongées jusqu'à environ onze heures."

⁴*Courrier de Provence, Lettre XI*, 36, 37: "Moins de nouveauté dans les discours des opinants de cette séance, et par conséquent moins de complaisance attentive dans l'assemblée." For the two sessions held on June 16 we have an account by Hardy, printed in *La révolution française*, XVI, 536-39. A study of the speeches delivered before June 15 and of the committees appointed by the commons shows that the deputies who spoke on June 15 were the chief men of the assembly.

being what we are and what we must be? Can the royal sanction change the order of things, alter their nature? We are the *représentants vérifiés de la nation*, the king can not change us to something which we are not; he can force us not to exercise the rights which this title gives us, but is it not necessary that this title should extricate us?" Camus, in these words, practically expressed the sovereignty of the people or of the commons. The assembly could and should constitute itself in such a manner and with such powers as it saw fit. He also severely criticised Rabaut's proposition of making a loan.¹

Crénières proposed that the assembly should constitute itself as *représentants de nos commettants*. He, as several others had done, advised that a certain time should elapse between the proposal of a project and the voting on it. The custom of voting at once upon important matters he thought unsatisfactory: "This custom, so convenient for those who speak, so painful for those who think, so favorable for those to whom the motions have been communicated in advance, and so cruel for those who, strangers to all parties, to all conspiracies, know only those projects which are forming in the assembly."²

Régnier and Prugnon supported Mounier's motion. The latter wanted to substitute for the phrase *en l'absence de la minorité*, the expression *en attendant la minorité*.³ Both Sieyès and Mira-beau rose in support of their motions and attempted to refute the objections made to them.⁴ Le Grand, a deputy from Berry, made a new motion.⁵ It was he who first proposed during these de-

¹Duquesnoy, I, 98; *Courrier de Provence, Lettre XI*, 36; *Journal des états-généraux*, I, 107-9.

²Duquesnoy, I, 98; Biauzat, II, 119.

³Duquesnoy (I, 98, 99) quotes Prugnon: "Les pontifes élèvent les autels de la religion contre les autels de la patrie; ils ont consigné l'esprit public à la porte de leur salle, pour l'empêcher d'entrer. Les droits de la noblesse sont anciens, les nôtres sont éternels; les siens se perdent dans la nuit des temps, les nôtres remontent jusqu'à l'origine des sociétés. Si la justice cessait d'être sur le trône, elle se réfugierait dans les communes. Les abus sont comme ces tours antiques qu'on ne peut détruire qu'on ôtant pierre par pierre et qu'il faut quelquefois laisser au temps le soin de démolir." *Journal des états-généraux*, I, 110; Biauzat, II, 119.

⁴*Courrier de Provence, Lettre XI*, 37; Biauzat, II, 119.

⁵*Courrier de Provence, Lettre XI*, 34-36; Biauzat, II, 119; *Journal des*

bates the title, *national assembly*. The two privileged classes, he asserted, were a part, but only a small part, of the nation; they were in the nation, but they could not have a separate existence as chambers; the deputies had to come to the general assembly if they wanted to take part in the national business. The motion declared for the indivisibility of the national assembly and against interference in its deliberations by any right of veto. This motion was overlooked; the hearers were tired and waiting for the midday rest. Pison du Galland made another motion similar to that of Le Grand. He proposed that the assembly constitute itself as a national assembly.¹ These speakers were followed by various deputies who for the most part favored Sieyès' motion.² According to Duquesnoy,³ a Lorrain proposed the title, national assembly. "All the speakers who followed appeared to adopt this advice, with the exception of Mounier, who delivered a long discourse in order to bring his motion again into favor."⁴

At about two o'clock, the assembly adjourned to five that same afternoon.⁵ Almost the whole evening session was taken up, either directly or indirectly, with the question of constituting the assembly.⁶ Mirabeau spoke in favor of his title and in opposition to the other titles. He had been angered by the reception of the word *peuple*. He knew the great superiority of his title, yet, because of his unpopularity and the great popularity of Sieyès, it was rejected. The assembly was led by men and not by ideas. He disliked Sieyès, according to Dumont, because he did not flatter him.⁷ He feared a revolution and saw the assem-

états-généraux, I, 111, 112; *Procès-verbal*, I, 98: "La discussion commencée hier a été reprise. Il a été proposé une nouvelle motion à l'assemblée sur la forme de sa constitution." This must have reference to the motion of either Le Grand or of Pison du Galland.

¹*Courrier de Provence*, Lettre XI, 34, 54, 55; Biauzat, II, 119.

²Biauzat, II, 119; Duquesnoy, I, 99. Andrieu, Robespierre, Durand, de Maillane, Girot de Pouzols, Roussillon de Toulouse, Regnaud, Rewbell, Bouchotte.

³Duquesnoy, I, 99. Possibly Duquesnoy himself.

⁴Duquesnoy, I, 100. According to Biauzat (II, 120) and the *Journal des états-généraux* (I, 116), Mounier spoke in the evening session.

⁵*Procès-verbal*, I, 99-104; *Journal des états-généraux*, I, 113.

⁶*Journal des états-généraux*, I, 113, 114.

⁷Dumont, 70: "Il était peu content de Sieyès et des Bretons, qui ne le flattaient point."

bly becoming more and more radical and presumptuous. "Assembly of the French people" was an unassuming title and could not cause any great antagonism and opposition. According to Dumont,¹ Duroverai² and Dumont helped him to prepare a speech that showed the strength of his title and motion and the weakness of the others. It was difficult for Mirabeau to obtain the floor, "but the galleries were so fond of listening to him that the assembly durst not persist in a refusal."³

Mirabeau expressed his surprise that, after he had repeatedly formulated his views in favor of the indivisibility of the states general, especially in the series of resolutions in which he had asserted the rights and the dignity of the people, he had been accused of wanting the isolation of the orders.⁴ "I speak here the language of liberty and I take for a foundation the example of the English and the Americans, who revere the word people."⁵ He did not attempt to degrade the people. In regard to the royal sanction, he said: "And I, gentlemen, I believe the veto of the king so necessary that I should much more prefer to live at Constantinople than in France without it. Yes, I proclaim it, I know nothing more terrible than the sovereign authority of six hundred persons, who, tomorrow, would provide for their life-long tenure, the day after tomorrow make themselves hereditary, and finish, like the aristocrats of all the countries of the world, in making themselves absolute."

Mirabeau then made a comparison of his motion with those of Sieyès and Mounier.⁶ He showed their similarities and dissimi-

¹Dumont, 74.

²A Genevese; a friend to the popular cause in France. Both Dumont and Duroverai aided Mirabeau in the editing of his paper and the writing of his speeches.

³Dumont, 74; *Journal des états-généraux*, I, 115; *La révolution française*, XVI, 537.

⁴In the *Courrier de Provence* (*Lettre XI*, 37-54), Mirabeau wrote: "L'auteur de la seconde motion reprit la parole à son tour, et l'on trouva dans son discours la substance de toutes les objections, de toutes les difficultés qui avaient été faites jusqu'à ce moment. En un mot, on peut considérer ce discours comme un précis de la délibération entière." *Journal des états-généraux*, I, 115-19.

⁵*Courrier de Provence*, I, 219. The elder Pitt used the expression, majesty of the people; the United States, the natural rights of the people.

⁶Both Sieyès and Mounier had spoken at least three times and this was

larities, and the advantages to the deputies of constituting themselves the *représentants du peuple*. The three motions agreed on the four cardinal points: the necessity of constituting promptly an active assembly; "the declaration that our assembly is not and may not be the states general"; the advantage of another title, under which the assembly might be constituted; the necessity of preventing any vote by chambers, any schism of the national assembly, any veto of the privileged orders. And Mirabeau's motion was more emphatic upon this last point than were the other motions. But what, he questioned, was the difference? What justified the deputies in being so violent in the debates? "Why is it that my motion, so clearly based upon principles which put it above every criticism, so explicit, so satisfactory for every man that detests, as I do, every kind of aristocracy, why should this motion be pictured as so inapplicable, so little worthy of an assembly of friends, of servants of this people which has charged us to defend it?" The other titles were too lengthy and were unintelligible to their constituents. *Connus* and *vérifiés* had no significance; these words did not distinguish the assembly from the other orders. The title and motion of Sieyès did not agree; a logical conclusion of the motion would be to constitute themselves as a national assembly, as states general. The title of Sieyès was based upon arguments and not upon positive law; "mine rests upon a fact, an authentic, undeniable fact, which is that we are the *représentants du peuple français*." The title of Sieyès is weak, for "the deputies of the clergy and the nobility may decide to come into our hall for the purpose of verifying their credentials, and return afterward into their respective chambers in order to vote there by order." This action would destroy the significance of Sieyès' title. Not so with the title of Mirabeau himself, for it would apply equally well after the union of the orders.

After defending his title against all criticism, he delivered a peroration "in a ringing voice."¹ He said: "I persevere in my

Mirabeau's third speech. *Courrier de Provence, Lettre XI, 37; Lettres de Mirabeau au major de Mauvillon, 467; Biauzat, II, 120; Duquesnoy, I, 100.*

¹*Courrier de Provence, Lettre XI, 37. Dumont, 74: Dumont wrote (74): "L'exorde que j'avais fait concilia passablement l'attention; la partie argu-*

motion and in the only expression which has called forth so much criticism, I mean the phrase, *peuple français*. I adopt it, I defend it, I herald it abroad for the very reason that has been urged against it. Yes, it is because the word *peuple* is not enough respected in France, that it is made obscure, covered with the rust of prejudice; because it presents an idea alarming to our pride and revolting to our vanity; because it is pronounced with contempt in the chambers of the aristocrats. It is for these very reasons that I wish it; it is for these very reasons that we ought to assume it, not only to elevate, but to enoble the name and render it thus henceforth respectable to ministers and dear to every heart. If this title were not already ours, it should be selected from among all others, and we should insist upon its adoption as the most precious method of serving that people, which is everything, from whom we derive our authority, that people whose representatives we are, whose rights we defend, and yet the assumption of whose name and title seems to raise the blush of shame on our cheeks. Ah! how I should exult, if by the choice of such a title, firmness and courage were restored to the down-trodden people! My mind is elevated by the contemplation of futurity, of the happy results which may proceed from the use, the adoption, of this name! The people will look up to us, and we will look up to the people; and our title will remind us of our duties and our strength. Under the shelter of a name which neither startles nor causes alarm, we can sow and cultivate the seeds of liberty. . . . Representatives of the people! vouchsafe to answer me! Will you go and tell your constituents that you have rejected this name of people? That if you are not ashamed of them, yet you have endeavored to elude this name as appearing not a sufficiently flattering title? That you wanted a more fastidious title than that which they could confer upon you? Gentlemen, do you not perceive that the title of *représentants du*

mentative passa entre des applaudissements et des murmures; mais cette péroration, qu'il prononça d'une voix tonnante, et qu'il fit écouter par une sorte de terreur, de quel effet elle fut suivie! Ce ne furent pas des cris, mais des convulsions de rage; l'agitation fut générale, une tempête d'injures fondit de toutes parts sur l'orateur, qui restait immobile et debout."

people is absolutely necessary, inasmuch as it will insure to you the attachment of the people, that imposing mass, without which you would be nothing but single individuals, nothing but slender reeds which might easily be broken one by one? Do you not see that you require the word people, because it informs the people that you have united your fate to theirs, because it will teach them to center in you all their thoughts and all their hopes?"

Especially the last part of this oration aroused great animosity in the assembly.¹ "It was succeeded, not by cries, but by convulsions of rage."² Many deputies interpreted Mirabeau's words as intended to intimidate and lord it over the assembly. The commons had become strong in working against difficulties and they would not tolerate any restriction whatever of their independence. Some of them believed Mirabeau wished to discredit their body by raising either the people against it or, if his title were accepted, the upper classes. It is in this connection that Biauzat remarks that from eight hundred to twelve hundred day-laborers attended the sessions,³ and Duquesnoy, that Mirabeau was a rascal and sold to the court.⁴ The majority of the deputies had no political training and, not having suffered from the abuses of an absolute form of government as Mirabeau had, they could not understand this attitude towards this question of constituting the assembly. They could not appreciate his conception of the significance of the word people. If his title, *representatives of the French people*, had been adopted as generally as was that of Sieyès, *national assembly*, we are inclined to believe that the cause of popular sovereignty would have received a greater impulse towards wholesome development than it did by the passing of the declaration of the rights of man even. The meaning of the word people was, as Mirabeau said, subject to the very broadest interpretation. His own conception of it was perhaps very similar to

¹*Courrier de Provence, Lettre XI, 53, 54; Journal des états-généraux, I, 119; Biauzat, II, 120; Duquesnoy, I, 100; Dumont, 75-77; La révolution française, XVI, 537, 538.*

²Dumont, 74-75.

³Biauzat, II, 120.

⁴Duquesnoy, I, 100-1; Young, 168, writes June 17: "There is a suspicion that he [Mirabeau] has received 100,000 livres from the queen."

our own use of it, that is, as including every individual of the whole nation. We can therefore, at present, better appreciate his truly wonderful effort in behalf of his title than did most of his colleagues. We do not mean to say that no egotistic motives prompted Mirabeau in his action. Well might a man aspire, under such circumstances, to give a name to such an assembly, and also to overcome a rival like Sieyès and a combination such as the Breton deputies and their friends. However, Mirabeau's heart was in the cause. His personality was much broader and richer than that of Sieyès, who withdrew from the scene of action as soon as his ambition was checked and his person perhaps in some danger. The deputies hissed and shouted with rage at the speaker, but "in the midst of this agitated and uproarious assembly, M. de Mirabeau continued his discourse; he was no longer heard. When he had finished, he raised his voice, shouting, 'If this part of my discourse is reprehensible, I am willing to take the blame and suffer the consequences. I leave it on the desk, signed by my own hand.'"¹ It appears that shortly afterwards he withdrew the manuscript and then left the hall.² We must not say that he departed just because he was angry with the assembly. He wrote, perhaps the same day, to a friend that he was bathed in perspiration during his speeches, because of fever. "I have spoken three times, while suffering from a chill."³ In his next *Lettre à ses commettants*, Mirabeau partly excused himself: "The word *peuple*, often repeated, has been taken for an appeal to the conscience of the deputies, as if it had been necessary to call them back to popular sentiments. It is not astonishing that those among them who understood him in this strange way were offended. But it is singular that anybody could deceive himself for the moment and suppose in the speaker a thought which was so far from his heart, and which could enter there less than ever on the day on which was discussed with so much zeal the honor of the assembly and the welfare of the nation. Convinced that it would suffice to read

¹ *Journal des états-généraux*, I, 119.

² *La révolution française*, XVI, 538.

³ *Lettres de Mirabeau au major de Mauvillon*, 467.

in a calmer mood this which he had said in order to remove all accusations so poorly founded, he contented himself with the apology of leaving the manuscript of his discourse upon the bureau and of signing it with his own hand."¹

Mirabeau's speech, being understood as it was, had stirred the assembly to its very depths. It was thought that, as the discussion continued, the agitation would become greater and possibly result in a division among the commons. The deputies wanted to act at once before graver obstacles could present themselves. The assembly wished to constitute itself in order to act as a unit against all combinations formed in opposition to it. Deputies had also been frightened by rumors of a royal session in which, it was said, the king would dictate his wishes and settle the dispute between the orders. The court, the higher clergy, and the nobility were thought to be in league with each other, and even a delay over night seemed to many deputies hazardous to the interests of the nation and of the assembly. These deputies demanded immediate action and called loudly for the question.²

It was with great difficulty that Le Grand, Pison du Galland, and Sieyès obtained the floor again and made themselves heard. Le Grand read again his motion which had received no notice in the morning session. Pison du Galland wanted the assembly to constitute itself as *assemblée légitime et active des représentants de la nation française*. This motion, well explained and tending strongly toward the idea of national assembly, was received with vigorous applause. A second reading was immediately demanded.³ Sieyès, under pretext of defending his motion, amended it. He made the motion read: "The title of *assemblée nationale* is the only proper name for the assembly. . ." The motion and title as amended suddenly gained favor.⁴ But certain individuals delayed the vote. They asserted that the amendment

¹*Courrier de Provence, Lettre XI, 53-54.*

²*Journal des états-généraux, I, 119; Biauzat, II, 120.*

³*Journal des états-généraux, I, 119; Courrier de Provence, Lettre XI, 54-55.*

⁴*Journal des états-généraux, I, 120; Revue de la révolution, XIII, Documents inédits, 12; Courrier de Provence, Lettre XI, 55; Duquesnoy, I, 101.* The last paragraph of Sieyès' motion as adopted on June 17 was entirely revised. *Procès-verbal, I, 2-4.*

to Sieyès' motion made it a new motion and therefore subject to new discussion and further clarification. But they were unsuccessful; the assembly decided in favor of putting the motion. It was now nearly midnight and many deputies had left the hall and gone to their lodgings. It was, therefore, urged that the assembly ought to adjourn to the next morning. The agitation became most violent.¹ The majority of the deputies promenaded the hall shouting either "aux voix, aux voix!" or "à demain, à demain!" or demanding further discussion of Sieyès' new motion.² Bailly, at this time president, wrote later: "The session of this evening was one of the most important and critical moments of my life," and "this day presented to me the image of two armies ready for attack."³ A large number labored under the impression that it was dangerous for the commons to wait, that preparations were made for the defeat of their plans, that the delay over night might destroy all the advantages they had obtained and counteract all the progress they had made up to this night. And there was truth in this belief, as will be shown later, but even illusions appear often grave realities, especially in the mind of excitable Frenchmen.⁴

But the assembly was finally restored to its equilibrium. A member loudly summoned "all good citizens" to be seated. About four hundred followed the advice, while about eighty still remained standing. This minority was then invited by some spectators to leave the hall and not to interfere with the action of the majority. This demand started a new commotion. The counter-demand, on the part of one of the eighty that the visitors ought to depart instead, was greeted with shouts of "you are traitors, bad citizens, leave the hall!" It seems that most of the minority actually did leave. Then a deputy, Biauzat perhaps, called at-

¹*Revue de la révolution*, XIII, *Documents inédits*, 12; *Journal des états-généraux*, I, 120; Duquesnoy (I, 101) says that 494 deputies voted against further discussion and 80 in favor of it. The *Courrier de Provence (Lettre XI, 56)* says that 99 voted in favor of renewed discussion. *Procès-verbal*, I, 104.

²Duquesnoy, I, 101; *Revue de la révolution*, XIII, *Documents inédits*, 12-13.

³Bailly, I, 150, 153.

⁴*Revue de la révolution*, XIII, *Documents inédits*, 12-13.

tention to the lateness of the hour. He observed that a great many deputies had gone home, that the members of the clergy who had joined were not there, that those still present were very tired, and that the roll-call would consume some time. He strongly urged that the session be adjourned to the next morning. In fact, such an important decision as the one under consideration ought to be taken in broad daylight when all the members were present and wide awake. It was an injustice to the absent members to act without their cooperation, and if there were bad citizens among the minority, they would be discovered if they were present and voted against the measure. This plan was adopted with the proviso that the debate be closed and that the roll be called immediately after the opening of the next session.¹

IV

In his *Journal*, under the date of June 17, 1789, Bailly wrote: "This day is forever memorable. It is that of the constitution of the assembly; it is that in which the assembly announced the rights of the nation and in which it showed, for the first time, the resolute and wise capacity which is fitting to the representatives of the nation and to the administrators of its authority."²

The session was opened with the announcement by Bailly that the assembly would at once proceed to vote upon the various motions that had been presented on the previous days.³ All further discussion was thus prevented, according to the midnight decision of the assembly. The preference of the deputies in regard to the propositions was known and was further made evident by the entrance of Sieyès. According to Dumont, "When Sieyès appeared in the hall, all the members, from a spontaneous feeling of respect, rose to receive him, and thunderous applause resounded from every side."⁴

¹Duquesnoy, I, 101-2; *Journal des états-généraux*, I, 120-21; Biauza, II, 122; *Revue de la révolution*, XIII, *Documents inédits*, 12-13.

²Bailly, I, 156.

³*Procès-verbal*, no. I, 1.

⁴Dumont, 78.

The dean ordered the reading of five motions and announced that a majority vote was absolutely necessary for the adoption of any one proposition.¹ The motion of Sieyès as amended was read first. It was carried by a large majority. Out of the 583 votes cast, 491 favored it, 90 opposed it, and 2 were not counted.² During the voting there was a most profound silence in the hall, but when the vote was announced a wave of enthusiasm swept over the assembly. The deputies and spectators alike repeatedly burst out into most enthusiastic cheers and shouts of: "Vive le roi! Vive l'assemblée nationale!"³ And they had good reason to be elated at this first great victory. It seemed to them that the die had been cast and that the fundamental questions requisite to any decisive financial reforms were solved. In their enthusiasm they for the moment lost sight of all future difficulties.

Sieyès' motion of constitution as finally amended thus passed into a resolution or decree, was signed by Bailly, as dean, and by the two secretaries. Some members had, on the previous evening, demanded that all the deputies of the assembly should sign their names to it. It was held, however, that the effect would be weakened thereby instead of strengthened. The list would not only be incomplete because of the absence of the deputies of the clergy and of the nobles, but it would even show a division in the constituted assembly itself. And the national assembly acted immediately on the principle that it embodied all the deputies of the states general.⁴

The national assembly then voted that an address be prepared which, together with the decree, should be presented to the king. In this address the loyalty to the king should be expressed and the reasons which prompted the deputies in constituting themselves the national assembly should be given. The deputies in-

¹*Procès-verbal*, no. I, 3.

²*Courrier de Provence, Lettre XI*, 57; Duquesnoy, I, 105; *Revue de la révolution*, XIII, *Documents inédits*, 13-14; *La révolution française*, XXIII, 534-35; *Le point du jour*, I, no. I, 3; Biauza (II, 122) says 492 votes favored it and 89 opposed it.

³Duquesnoy, I, 105; *Revue de la révolution*, XIII, *Documents inédits*, 13-15; *Le point du jour*, no. I, 3; Rabaut de Saint-Etienne, *Précis*, 124-26.

⁴*Procès-verbal*, no. I, 1, 2; Duquesnoy, I, 105; *Courrier de Provence, Lettre XI*, 56-57.

deed were filled with the greatest patriotism; they loved their country and their king as the nation's chief representative. Many of them, no doubt, went even so far in their imagination as to think that the king was with them and that the victory over the privileged classes was already won; they could not control their emotions therefore, and again and again they burst out into cries of "Vive le roi!"¹ It was a beautiful dream that filled the working hours of the deputies of the third estate. To them, they believed, had fallen the magnificent task of becoming the benefactors of twenty-five millions of Frenchmen, of setting the nation in the straight road towards perfection and of making France the model and the savior of the world.

Not all the deputies were, however, happy. The great statesman, the keen observer, Mirabeau, took matters more philosophically. Referring to his collaborators, he, in the presence of a friend, exclaimed: "What a pity! Do they imagine that all is over? I should not be surprised if civil war were the fruit of their pretty decree."² He was no doubt thinking of the difficulties that confronted the national assembly. He knew that these deputies who had no experience whatever in statesmanship had a task almost superhuman before them in the regeneration and reconstitution of France. In this work of the national assembly, the king, the court, the privileged classes, the nation, the national assembly itself had to be taken into consideration. The question might well be asked by a man like Mirabeau whether the social and political conditions of France could be properly adjusted to the ideas of the deputies of the third estate, constituting either alone the national assembly or the majority party in the national assembly. The failure of the national assembly to bring about the necessary reforms meant, as Mirabeau said in his speeches of June 15 and June 16, revolution, anarchy, despotism. June 17 marked a great crisis in the French revolution, but it was only

¹*Procès-verbal*, no. I, 4-5: ". . . la salle a retenti des cris multipliés de vive le roi."

²Dumont, 78: "Quelle pitié! me dit Mirabeau; ils s'imaginent donc que tout est fini; mais je ne serais pas surpris si la guerre civile était le fruit de leur beau décret."

the first of a series of crises. Madame de Staël says of the constitution of the third estate that "it was the revolution itself."¹

Since the deputies had now formed themselves into an active assembly, Bailly requested the election of regular officers. But time was thought precious; other business was considered more urgent. Bailly, who was, up to this time, called dean, was continued as president, and Camus and Pison du Galland as secretaries.²

The next step on the program was a very impressive one. The president and secretaries took an oath to fulfil their functions faithfully. The president next administered the oath to the assembly. To the deputies, standing with uplifted right hands and profoundly silent, the president repeated the following formula: "*Nous jurons et promettons de remplir avec zèle et fidélité les fonctions dont nous sommes chargés.*" The assembly solemnly responded: "*Nous le jurons et promettons.*" "This imposing and truly religious act" was followed by an outburst of applause.³

There had been much discussion as to the wording of the formula. Bailly had proposed the expression: "*Nous jurons tous à Dieu, au roi, à la patrie de remplir avec zèle et fidélité la mission que nous avons reçue.*"⁴ But it is clear that the assembly did not wish to commit itself to the king, even on this day of good feeling. While the deputies at one time practically lost themselves in enthusiasm and expressions of admiration for the king, shortly afterward they formulated an oath, to which they swore in the most solemn manner, that could not be more formal, less emotional, more non-committal, more general. They swore to no one, they promised nothing to anybody but to France itself. They vowed to perform the functions with which they were charged.

¹ Staël, I, 164; Chérest, III, 144.

² *Procès-verbal*, no. I, 5, 9-10. *Courrier de Provence*, Lettre XII, 4; Biauzat, II, 122; Duquesnoy, I, 105; *Revue de la révolution*, XIII, *Documents inédits*, 14.

³ *Procès-verbal*, no. I, 10; *Courrier de Provence*, Lettre XI, 57; Biauzat, II, 122-23; Duquesnoy, I, 105-6; *Revue de la révolution*, XIII, *Documents inédits*, 14.

⁴ Duquesnoy (I, 105) wrote: "Cette formule noble, grande, paraissait devoir être adoptée; cependant, sans qu'on puisse dire pourquoi, on a préféré la suivante . . ." Biauzat, II, 123; *Le point du jour*, no. I, 4.

The decree that they had just passed announced that, "It pertains to the national assembly alone to interpret and to present the general wishes of the nation." The national assembly could assume, therefore, according to these expressions, all the powers that it wished; it could constitute France, it could legislate for France.

Thus constituted and ready for the great work before it, the assembly sought at once to fortify itself by declaring its policy and its powers. The advice of Mirabeau, as presented in his resolution on June 15, that to constitute the assembly was not sufficient—its principles should also be announced—was now followed. Up to this time, the public had looked upon the disputes, the inactivity of the states general with wonder and doubt. France had been left in suspense as to the outcome of all the agitation between the orders. A new order of things had been expected, a regeneration of France had been looked for, but these expectations had not been realized. It was now the business of the assembly to calm the public and to make it realize that the reforms for which it had so long striven would be secured. The national assembly, therefore, decided to make a general statement of its policy, and in this way present something tangible around which public opinion could form. The support of the public was necessary in order to successfully conquer the deputies of the clergy and of the nobility.

To this end, the national assembly declared that taxes could be legally voted only by the representatives of the nation; that since the existing taxes had not received this consent they were illegal, consequently null and void in their creation, extension, and prolongation. But the assembly "declares, by a unanimous vote, that it consents provisionally, in the name of the nation, that the taxes,¹ although illegally imposed and collected, continue to be raised in the same manner as they have been heretofore, but only up to the time of the separation of this assembly, no matter from what cause the separation may proceed. After the day of separation, *l'assemblée nationale entend et décrète*² that every levy of taxes³

¹"*Impôts et contributions.*"

²Orders and decrees.

³"*Impôts et contributions.*"

of whatever nature, which shall not have been particularly, formally, and freely granted by the assembly, shall cease entirely in all the provinces of the kingdom, no matter what may be the form of their administration."¹

The purpose of the deputies in this decree may be easily seen. The national assembly provided for non-interference in its business. Heretofore the government had repeatedly interfered with parliaments and states general; it had even dissolved them. But this assembly was considered by its members as a different body. It was a national assembly and as such possessed and expressed the highest authority of the state, the sovereignty of France. The government was to be, thenceforth, at the mercy of the national assembly. It could not exist without an income. The time when a government and armies could live from plunder had passed; the nation was ready to regulate its own affairs. If the government should undertake to interfere with the business of the assembly or even to dissolve the assembly, it would henceforth meet with difficulties which it would not be able to overcome. After the national assembly had declared so strongly that its mission was to work for the good of France, its existence was secured. Its decrees would be followed by the public, and if it were dissolved, the government, in order to exist, would be forced to call at once another national assembly. The people in their instructions to the deputies had expressed their wishes, they had claimed their rights and made their demands, and if they should be assembled for another election, they would be still more exacting. The deputies knew that the government would bear all these considerations in mind and that the government of Louis XVI. was wretchedly weak.

This decree was truly revolutionary. The national assembly spoke as a sovereign; the king's power was no longer absolute; the constituent assembly had begun its work in limiting the monarchy; the idea of the divine right of kings had been rejected and popular and national sovereignty had been declared.

¹*Procès-verbal*, no. I, 10-14. Le Chapelier and Target prepared this decree. Biauzaat, II, 123, 124; *Courrier de Provence*, Lettre XII, 1-4; Duquesnoy, I, 106; *Le point du jour*, no. I, 5.

The assembly believed itself strong enough to put this new doctrine into practice, for the decree stated further: "The assembly hastens to declare that as soon as it shall have fixed, in concert with his majesty, the principles of the national regeneration, it will occupy itself with the examination and with the consolidation of the public debt, putting the creditors of the state from this time on under the protection, the fidelity, and loyalty of the French nation.

"Having at last begun its work, the assembly recognizes also that it owes its first efforts to the examination of the causes which produce in the provinces of the kingdom the poverty which oppresses the people and also to the investigation and development of plans which may remedy the situation in the most prompt and efficacious manner. Consequently, it has decided to name a committee which is to occupy itself with this important object. . . . The present resolution will be printed and distributed in all the provinces."

It was thus, on June 17, 1789, that the commons took the first revolutionary step by declaring themselves the national assembly. The assumptions of the sovereignty of the people, of the right of the majority to rule, and of the negation of the political independence of the clergy and of the nobility were all involved in this act that marked the beginning of a new era for France.

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The principal sources of information upon the history of the sessions of the three orders of the states general and of the conferences of the commissioners are the minutes, letters of the deputies, and newspapers. Gaultier de Biauzat wrote, as early as May 22, 1789, that there were more than a hundred men in the assembly of the third estate who took notes. These notes were taken for personal reasons as well as for use in the preparation of the accounts sent by some of the deputies to their friends and constituents. A part of this most valuable literature was published during the last generation. A large bulk of it still lies buried in private and provincial archives. Some of the *procès-verbaux* and newspapers are more or less easily accessible. I have studied critically most of the material used in the preparation of this monograph and have published the results in an article entitled *The Fourth of August, 1789*, which appeared in the *University Studies* of the University of Nebraska (vol. VI, no. 4, October, 1906). The reader is referred to this publication for the study of the sources. I shall enumerate here only the material used for this monograph. Where, however, the material gives information on the period covered by the present work and has not been discussed in the previous publication, critical notes have been added.

Journal d'Adrien Duquesnoy, député du tiers-état de Bar le-Duc, sur l'assemblée constituante. 3 mai 1789 — 3 avril 1790. Publié pour la société d'histoire contemporaine, par Robert de Crévecoeur. 2 vols. Paris, 1894.

Mège, Francisque: *Gaultier de Biauzat, député du tiers-état aux états-généraux de 1789. Sa vie et sa correspondance.* 2 vols. Paris, 1890.

Albert Macé has published in the *Documents inédits* of the *Revue de la révolution* a number of letters of Jean-Pierre Boullé. The letters were written to his constituents of the *tiers-état* of the *sénéchaussée de Ploërmel* and addressed to the municipal officers of Pontivy. Those published cover the period from May 1 to October 30, 1789. They are found in volumes X, 161-71; XI,

11-20, 45-53, 113-20; XII, 7-14, 35-42, 49-58, 109-12; XIII, 11-17, 65-79; XIV, 26-32, 42-51, 82-92, 114-23; XV, 13-28, 99-120; XVI, 15-29, 45-84. In the political correspondence of the time, these letters of Boullé rank very high.

In vol. II, *Documents inédits*, 1-8, 33-41, 65-74, 97-104, and 139-43, B. d'Agours publishes the *Correspondance d'une député de la noblesse de la sénéchaussée de Marseille avec la marquise de Créquy, à Blaincourt, par Bricenne, Champagne (13 mai—8 août 1789)*. These letters are of special value because the writer, unlike the others who favored the third estate, sympathized with the privileged classes. On June 18, he says: "The states general are going to the devil. . . . This assembly of the third estate degenerates into extravagances," and on June 26: "The states general goes from bad to worse."

M. A. Brette has published a "*Relation des événements depuis le 6 mai jusqu'au 15 juillet 1789*" in *La révolution française, revue d'histoire moderne et contemporaine, publiée par la société de l'histoire de la révolution*. Vols. XXIII, 348-68, 443-71, and 520-47, and XXIV, 69-84 and 162-78. It is the work of a "secret agent," who spent part of his time in Paris and part in Versailles. He followed the various incidents connected with the sessions of the three orders very closely, even when at Paris, and tried to observe especially their influence upon public opinion. The name of the writer is not known, but he appears to be a person of some importance. His bulletins seem to be very valuable. M. Ch.-L. Chassin has printed extracts from these bulletins in his collection of source-material: *Les élections et les cahiers de Paris en 1789*. 4 vols. Paris, 1888-89. Vol. III, 415-23, 453-60, 465-68, 490, 544-45.

Messieurs Corre and Delourmel have published in the same review, vols. XXXIX, 515-58, and XL, 46-78, extracts from the letters of L.-F. Legendre, deputy of the *tiers-état* of the *sénéchaussée de Brest*. The correspondence covers the period from April 28, 1789, to December 30, 1791. Unfortunately, for the period covered by our present study, the extracts given are few and brief.

In vol. XVI, 536-39, M. H. Monin publishes the account of

the two sessions of the *tiers-état* held on June 16, 1789, given by Hardy in his journal. Hardy was present at the meetings.

M. Ch. Le Téo has, in vol. XXXVI, 385-95, an article entitled *Le club breton et les origines du club des Jacobins* in which he gives short extracts from the correspondence of deputies.

Récit des séances des députés des communes, depuis le 5 mai, 1789, jusqu'au 12 juin suivant, époque à laquelle la rédaction des procès-verbaux a commencé. 172 pp.¹ On December 10, 1789, the national assembly appointed three commissioners, Salomon, Camus, and Emmercy, to draw up this account. They did so and signed their names to it. Camus was on June 12 chosen secretary, and he and the other two men were repeatedly chosen for secretary purposes. Camus was even made superintendent of the newly created archives. These men either used their own notes or employed notes of other deputies. Camus presided over the electoral assembly of Paris for the last time on May 22, and was present at Versailles only after that date. We have observed that Gaultier de Biauzat wrote on May 22 that over a hundred men took notes. On May 11 a motion was made that the dean's assistants keep notes, and on May 20 that a *comité de rédaction* be chosen to draw up an account of the sessions and edit it in order to be sent to the people. It is seen, therefore, that the deputies were conscious of the importance of taking notes from the very first, and that it must have been a comparatively easy task to prepare the *Récit*. Some *curés* kept journals and the nobles kept *procès-verbaux* of their sessions. M. A. Brette enumerates this material in the *Avertissement* of his volume, *Les Constituants* (Paris, 1897), and M. Maurice Tourneux in the first volume of his *Bibliographie de l'histoire de Paris pendant la révolution française*, Paris, 1890, p. 78.

Courrier de Provence by Mirabeau, preceded by his two numbers of *Etats-généraux* and nineteen *Lettres du comte de Mirabeau à ses commettants*, three hundred and fifty numbers, 17 vols., in 8°, appeared between May 4, 1789, and September 30, 1791.

Journal des états-généraux by Le Hodey de Saultchevreuil. I

¹I have used M. Aulard's edition of the *Récit* published in 1895 by the Société de l'histoire de la révolution française.

have called this journal *Assemblée nationale* in my former study, because that was actually its title from June 17, 1789, to January 5, 1791, when *ou journal logographique* was added; by this name it is clearly distinguished from all other journals. *Journal des états-généraux* is only the cover title for some of the sets.¹ No number was ever issued with the title *Journal des états-généraux*. Four numbers, covering pp. 1-32, 33-62, 63-78, 79-102, appeared before June 17, 1789, and they have the title *Etats*. The first of these contains an account of the sessions of June 1 to June 6. According to the editors (II, 70), it was during the first part of June that the journal was started. In the same connection, in the number which has a partial account of the session of July 18, they say that the next day an account of the sessions held during the month of May would be issued. This narrative of eighty pages bears the title *Etats-généraux*, evidently in contradistinction to the title *Assemblée nationale*, which it had after June 17.

Le point du jour, ou résultat de ce qui s'est passé la veille à l'Assemblée Nationale. 815 numbers. June 19, 1789, to October 2 or 3, 1791. 27 vols., in 8°. Paris, chez Cussac. Barère, the editor of this journal, issued in 1790 a volume entitled *Le point du jour, ou résultat de ce qui s'est passé aux états-généraux, depuis le 27 avril 1789, jour annoncé pour leur ouverture, jusqu'au 17 juin de la même année, époque où les communes se sont constituées en assemblée nationale*; par M. D.***, député extraordinaire. Paris, Cussac, 1790. *Discours préliminaire* XXXV, 415 pp. This volume is for the most part a compilation of extracts taken from other sources. Much of the material is found in the *Lettres de Mirabeau à ses commettants*, and the *Procès-verbal des conférences sur la vérification des pouvoirs* (216 pp.) is, for example, bodily incorporated. In places, however, the names of speakers are inserted instead of "a deputy of the com-

¹ 35 vols in 8°, 1789-92. The copies in the libraries of the *Archives nationales*, Paris, listed as AD^A/309, of the British Museum, London, listed as F. 1524²⁺, and of President White at the Cornell University library, Ithaca, New York, listed as 4182 V b 1-35, have the cover title *Journal des états-généraux*. The set in the *Bibliothèque nationale*, Paris, listed as Lc²/136, has the book title *Logographie*.

mons" or "a deputy of the nobles." If this work is used at all it must be carefully compared with the strictly original source-material. It makes such mistakes, for example, as to place the solemn procession to the church St. Louis and the services held there on May 5 instead of May 4, and the opening session of the states general on May 6 instead of May 5. Similar errors are found throughout the whole volume.

Gazette nationale, ou Le moniteur universel.¹ There is in the Cornell University library a complete set of the original edition of the *Moniteur* extending from January 1, 1790, to December 31, 1867, and there is another set of the original edition of the *Moniteur* in the President White library of the Cornell University library, which covers the period from November 24, 1789, to December 30, 1794. This set is a duplicate, therefore, of the numbers between January 1, 1790, and December 30, 1794. And the thirty-eight numbers from November 24 to December 31, 1789, if taken with the other set, entirely complete the set. We mention the fact that the original thirty-eight numbers of 1789 and the thirty-three numbers from January 1 to February 2, 1790, and even two copies of the thirty-three numbers, are here because they are very rare.² There is here also the original introductory volume to the *Moniteur* prepared in 1795-96. It contains the *Introduction historique*, the ninety-three compiled numbers covering the period from May 5 to November 23, and the thirty-eight revised numbers (numbers 93-131) for the period between November 24 and December 31, 1789, and the *Pièces justificatives*.³

Buchez, B. J. B., et Roux, P. C.: *Histoire parlementaire de la révolution française, ou journal des assemblées nationales depuis 1789 jusqu'en 1815*. 40 vols. Paris, 1834-38. The *Histoire*

¹The edition of Gallois: *Réimpression de l'ancien moniteur depuis la réunion des états-généraux jusqu'au consulat (Mai 1789—Novembre 1799), avec des notes par M. Leonard Gallois* (31 vols., Paris, 1840-47), is more generally accessible than the original folio edition.

²Tourneux says in his *Bibliographie*, II, pp. 556 and 789, that he knows of only four sets of these numbers.

³I have described this volume in *The Fourth of August, 1789*, pp. 16-39. I am inclined to think that if the editors of the *Moniteur* actually carried out the plan they announced in their paper of October 30, 1795, of printing

parlementaire draws its material for the sessions of the three orders from the *Moniteur*. It has for our subject, therefore, not the slightest value.¹

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Aulard, F. A.: *La société des jacobins. Recueil de documents pour l'histoire du club des jacobins de Paris*. 6 vols. Paris, 1889-97.

Procès-verbal des séances des députés des communes, depuis le 12 juin 1789 jusqu'au 17 juin, jour de la constitution en assemblée nationale. 104 pp.

Procès-verbal de l'assemblée nationale. 75 vols., in 8°. Paris, 1789-91. Baudouin. These two sources belong together. The second is a continuation of the first and dates from June 17, 1789. The first is commonly bound in with the first volume of the second. The *Procès-verbaux* consist of minutes taken and material arranged by the secretaries of the assembly. They are of the greatest value because they were read to the assembly from session to session for the sake of accuracy. For our period Camus and Pison du Galand were the secretaries.²

Procès-verbal des conférences sur la vérification des pouvoirs. 216 pp. Target, one of the commissioners of the *tiers-état*, prepared the larger part of the work. On June 4, Hébert was chosen official secretary (p. 153). The Marquis de Bouthillier objected (p. 171), on the part of the nobles, to the draft of Target on the ground that the arguments of the commissioners of the third two volumes, that in the second volume the original numbers covering the period from January 1 to July 1, 1790, were simply reprinted.

¹See my study, *The Moniteur and Other Sources*, *Graduate Bulletin*, the University of Nebraska, March, 1902, 17-18. The *Histoire parlementaire*, I, 384-474, omits entirely the accounts of the sessions of the third estate on May 8, 9, 11, 14, 16, 20, 22, 25, and June 2, 3, 4, 5, 6, 7, 8, 9, 11, 13, 14, and of the conferences of the commissioners. Almost all of the sessions of the clergy and of the nobles are left similarly unmentioned. The compilers wished to abridge the *Moniteur*, and so they omitted either the accounts of whole sessions or reproduced them only in part by omitting paragraphs. Not only is very important material left out and relatively unimportant matter given, but the context is thus destroyed. The substance of the accounts omitted is seldom given and then only by brief paragraphs.

²See my *Fourth of August, 1789*, 1-5, 24-26.

estate were reproduced at greater length and to better advantage than those of the commissioners of the nobles. We sustain Bouthillier's objection and note that allowance must be made for this defect; otherwise this work is of the greatest value.

Young, Arthur: *Travels in France during the years 1787, 1788, 1789, with an introduction, biographical sketch, and notes by M. Betham-Edwards.* Second edition. London, 1889.

We made some use of the following source material of less value:

Mémoires de Bailly, avec une notice sur sa vie, des notes et des éclaircissements historiques, par MM. Berville et Barrière. 3 vols. Paris, 1821.

Rabaut, J. P.: *Précis de l'histoire de la révolution française. Assemblée constituante, suivi de réflexions politiques sur les circonstances.* Septième édition. Paris, 1819.

Dumont, Etienne: *Souvenirs sur Mirabeau et sur les deux premières assemblées législatives, ouvrage posthume, publié par M. J. L. Duval.* Bruxelles (et Leipzig), 1832. In the same year an English translation of it appeared. There are later editions of it in both French and English.

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Ford, Paul Leicester: *The Writings of Thomas Jefferson.* 10 vols. New York, 1895, vol. V.

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Montjoye: *L'Ami du roi, des français, de l'ordre et sur-tout de la vérité; ou histoire de la révolution de France, et de l'assemblée nationale.* Paris, 1791-92.

Droz, Joseph: *Histoire du règne de Louis XVI., pendant les années où l'on pouvait prévenir ou diriger la révolution française.* 3 vols. Paris, 1839.

Bertrand de Molleville, A. F.: *Histoire de la révolution de France, pendant les dernières années du règne de Louis XVI.* 14 vols. Paris, 1801-03.

Lameth, Alexandre: *Histoire de l'assemblée constituante.* 2 vols. Paris, 1828-29.

Memoires du marquis de Ferrières, par MM. Berville et Barrière. 3 vols. Paris, 1821.

Histoire de la révolution française par M. Necker. 4 vols. Paris, 1821.

We have read what other memoirs and the various histories of the French revolution say on our subject. We mention in our bibliography, however, only the work of Chérest, Aimé: *La chute de l'ancien régime (1787-1789)*. 3 vols. Paris, 1884-86. Vol. III deals more in particular with our subject. It contains the best account we have. Chérest used his material on the whole intelligently. He made good use of the *Récit* and the *Procès-verbaux* and the *Lettres du comte de Mirabeau à ses commettans*. But he employed altogether too much the mémoire literature, which is of questionable value, and too much material from the *Histoire parlementaire*. He preferred this work to the *Moniteur* and the *Archives parlementaires*, both of which he used at intervals, although it is vastly inferior to either of the others. Furthermore, he naturally made no use of the political correspondence of deputies which has been published since his day.

We mention finally a study by Dr. Charles Kuhlmann on the *Influence of the Breton Deputation and the Breton Club in the Revolution (April—October, 1789)*, which appeared in the *University Studies*, October, 1902.

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I.—*The Separation of the Spectral Lines of Thorium in the Magnetic Field*

BY B. E. MOORE

PART I. INTRODUCTION, EXPERIMENTAL METHOD, AND PECULIAR FEATURES OF THE THORIUM SPECTRUM.

The spectral photographs of this substance were taken during the winter semester of 1907 at the physical institute of the University of Göttingen at the suggestion of the director, Prof. W. Voigt, who courteously placed all the necessary equipment at my disposal and enthusiastically promoted the investigation. This was at the time I studied the spectra of barium, yttrium, zirconium, and osmium (*Univ. Studies*, Jan. 1908). The thorium lines were found to be too numerous and entangled to admit of ready identification and were therefore laid away for study at a more opportune time. A component or more of a line is frequently found between the components of another line. Two components of different lines may lie so close together that one can tell with difficulty to which of the two lines they may belong; or two or more components may overlap. These overlaps are of various degrees, i. e. in one extreme they may be merely touching each other and form one broad line; or in the other extreme be accurate duplicates in position, and produce an intensified sharp line. How complicated this becomes may be illustrated by one small region, six Aengstrom units wide, about the separation of D_1 and D_2 , where there were found components of thirteen lines. These

entanglements are usually unraveled by studying the photographs of two field intensities. Such a method I have pursued, but unfortunately the field strengths differed by only 20 per cent, where 40 per cent difference was desirable. Sometimes the overlaps are so sharp that one falls into no particular error in assuming them to be the centers of two overlapping components. But one can not regard this procedure as accurate as measurements of isolated components. Neither have I regarded the measurements upon the weaker field plates alone as accurate as the other measurements. Further, they would be less accurate than lines measured for both field strengths and in both first and second order. All the less accurate measurements have been enclosed in parentheses.

A characteristic of the thorium spectrum is that the components which vibrate perpendicular to the lines of force, the *s*-components, are usually narrower and sharper than those which vibrate parallel thereto, the *p*-components. This was helpful in isolating the *s*-components. The thorium lines with no magnetic field were usually very sharp, but there were exceptions, and these were lines which behaved peculiarly (see later). This sharpness of the no-field lines led to the following method of identifying the lines and components thereof, for both kinds of vibrations—a method which saved a great amount of labor and led to some important discoveries. Each set of plates was cut in two longitudinally through the center, and the edges of the lines of either the *p*- or *s*-components brought into juxtaposition with the ends of the lines upon the no-field plates in the center of the field of view of the microscope. One-half of the field of view of the microscope had a fixed cross wire (a diamond mark on glass); and upon the other half of the field of view there was a movable system of lines in pairs of various separations. A sharp no-field line was brought under the single fixed line and the corresponding *s*- or *p*-line placed as nearly symmetrical as possible therewith, by hand adjustment, under the other cross-wire system, and the final adjustment made by a micrometer which controlled this cross-wire system. By means of another micrometer the whole microscope could be moved, and by means of this motion one

could pass readily from one line to another coincidentally upon both sets of plates. In this way a series of readings was then taken for a number of lines in the field of view upon both sets of plates. The majority of these adjacent lines were duplicates in position within the errors of setting the microscope. This error for the p -components was twice as great as the corresponding error for the no-field lines. The latter also can be adjusted more accurately than the double readings of the s -components of a triplet.

By this method of comparison I discovered that a great many of the lines were unsymmetrical in position, assuming that the lines which could be brought into juxtaposition were symmetrical. If, however, as Professor Voigt writes me, there should be a one-sided displacement of the p - or s -components, it might be impossible to detect it, as the plates would be displaced as a whole. Such a displacement or dissymmetry is theoretically derived by Professor Voigt.¹ It involves the period of the vibrating ion and a constant which depends upon the absorption and emission of the ion. This constant would vary from ion to ion, and therefore there would be large variations from line to line, unless the lines arose from the same ion. From Geiger's² investigation, the displacement is only one two-thousandth part of the total separation of the D_1 line for a field strength of 2,400 lines to the square centimeter. But for the red K -line corresponding to D_2 Geiger's data give a ratio of 3 per cent. The latter would be observable unless the lines were diffuse. We may, then, in a great many cases expect the effect to be too small to be observable. Even if it were generally observable in any particular substance, the great range in values would make it impossible to set the greater part of the lines in juxtaposition on the two sets of plates at the same time. Therefore, the juxtaposition of most lines indicates that the effect is too small to be observable in those cases. For the weak lines, the effect being a function of the emission, the displacement should be small, and probably smaller than I could detect. On account of the width of many of the p -components,

¹*Phys. Zeit.* 9 (1908), p. 123, eq. 11.

²*Ann. d. Phys.* 24 (1907), p. 597.

it would escape detection at any rate. Again, any irregular contraction of the films in drying would cause appreciable error in the measurement of very small quantities. Errors from such sources are mitigated by taking several sets of plates. Two sets of *s*- and *p*-plates were at my command, but only one set of no-field plates. When irregularities were present upon one set of plates they were also present upon the other, but the difficulty might be with the no-field plates with which they were compared.

For the purpose of detecting small variations, then, the method is not altogether free from error. But if both *s*- and *p*-components are photographed together, i. e. without the intervening calcite, neither does one then know whether the *p*-component or the *s*-components are displaced in an unsymmetrical triplet; and if the *p*-component happens to be a wide line and the *s*-components have small separations, the readings are then confusing and much less accurate than the method which I have followed. Had I anticipated the dissymmetry of lines at the time these photographs were taken, I should have desired to have photographed the *p*- and *s*-components directly upon the same plate as the no-field lines, by the long-established method of Rowland, viz., by taking two exposures upon one plate, covering one-half of the plate for the no-field exposure and the other half of the plate for either the *p*- or the *s*-exposure. Even then, it occurs to me, that the method might not be accurate enough to test dissymmetries as small as one might expect from the Voigt equation, as it also seems to me that the method is not quite accurate enough to test quadruplets and triplets for simple relationship between the magnitudes of the separations (e. g. Are these separations related to a normal "*a*", and are they multiples of aliquot parts of "*a*"?) My previously measured triplets would certainly not suggest the choice of any value as a normal, and neither would the quadruplets in the present investigation.

The question, however, does arise, Is there adequate error to allow one to collect them into groups whose separations are related to one another in a simple way? I do not think the error so large. However, it does seem to me what is wanted to answer this interesting question and the dissymmetry question as well,

from the standpoint of Voigt's equation, is an experimental method of five times the accuracy which one may possibly obtain with some of the new forms of interferometer. Such a method was used by Gmelin (*Phys. Zeit.*, vol. 9, p. 212), who found the mercury line 5790λ to have a dissymmetry proportional to the square of the field strength. This results from the hypothesis of linkages among the electrons (Voigt, *Phys. Zeit.*, vol. 9, p. 353). The field strength of the two sets of plates here studied differed only by 20 per cent, and were not adapted to an investigation of that point, like Gmelin's observations, whose field strength varied two and one-half fold. However, the following considerations will show that my measurements should have given me some intimation of such a change with the change in field strength. If one designates the distances of the two s -components from the null position by " a " and " b ," the distance from the middle is $(a+b)/2$, and the deviation of the apparent middle is $(a-b)/2$. For 20 per cent greater field, on the assumption of Gmelin, the former is increased 1.2 times, and the latter $(1.2)^2$ times. The weaker of my dissymmetrical lines were measurable only upon one set of plates, but those lines which could be measured upon both sets of plates gave practically the same results when the separations of the weaker field were increased 1.2 times. It would not seem that *all* of the difference for *all* of the lines was due to experimental error. If the result is granted, it would mean that the dissymmetry is proportional to the field strength. However, greater variation in field strength would be more competent to settle the question. From the Voigt equation the above half sum is also the usual separation and the half difference the dissymmetry. The latter value is a constant, and is independent of the field strength. Now there are cases in thorium where a equals $3b$, and therefore the magnitude of the dissymmetry is b . Maintain this value of b constant and diminish the field one-half. The distance from the apparent middle is then $(a+b)/4$ which equals b . One component then falls in the null position, and only the other component is displaced. This is meaningless. And 20 per cent difference in field should have given me something different from what was observed if there

was any constancy in the value $(a-b)/2$. Therefore, there seems some reason to assume that the dissymmetries are due to some other causes than those discussed in Voigt's equations.

Dissymmetry has also been observed by Mr. Jack (Zeeman, *Phys. Zcit.*, vol. 9, p. 343). His spectrographs were taken partly prior and partly subsequent to these thorium spectrographs and with the same apparatus. Professor Voigt writes me that Mr. Jack thinks he has traced the dissymmetry to changes in the azimuth of the polarized beam of light incident upon the grating. This is important, if true. I think two experimental facts make it implausible in thorium: firstly, a number of the observed dissymmetries are too large; secondly, before placing the plates in the camera for an exposure the quartz condensing lens was often shifted and readjusted to see that there was the best possible illumination of the grating. (But the lens was never moved during an exposure.) It does not seem probable that this lens occupied the same position throughout the thorium exposures or even the greater part of them. Consequently, any point on the grating was illuminated at different times by light in a different azimuth. If the effect had been appreciable, it would have produced inconsistencies in my measurements, which I have not observed.

In my previous investigation (*l. c.*) the *p*- and *s*-components were measured on independent plates. Small dissymmetries would have remained undiscovered. It should be said, however, that for these substances I had plates with both *p*- and *s*-components thereon, i. e. plates photographed without the intervening calcite. As I passed from line to line comparing the intensities of the *p*- and *s*-components, some of the pronounced dissymmetries herein recorded would have been glaringly conspicuous without measurements. Further, the dissymmetries are not only often large but they are found also in lines having more than three components up to and including a line of nine components. In these also may be found multiple relationships among the unsymmetrical components, which could be only a coincidence unless these dissymmetries were proportional to the field strength. Thorium was also photographed without the intervening calcite, but the

components were too entangled and bewildering to be of any service, and the plates were not saved. This resulted in some loss in the comparison of the intensities of the *s*- and *p*-components. The relative intensities of the *s*- and *p*-exposures can therefore only be roughly approximated. To obtain an accurate basis of comparison, the *p*-intensities may need to be reduced about 25 per cent. The intensities here recorded are multiples of apparent brightness of the components in the first order spectrum, taking a line which is just sufficiently defined to be continuous latterly across the plate as unit intensity.

In the dissymmetry theory there is a dissymmetry in the intensity of the components. The component which has a smaller displacement than its companion should have greater intensity. In Mr. Jack's lines reported by Zeeman (*l. c.*) there is no such inequality recorded. In thorium the least displaced component is always the stronger. There are a few apparent exceptions, but these are invariably due to overlapping components of adjacent lines. However, there are a large number of lines which show this dissymmetry in intensity for which there was no dissymmetry in separation. Some of these, again, are plainly overlaps, but there are a great many which are not. Farther, there are cases where components are broader than their conjugate components. No accurate record could be made of this, for the effect might be slight or large. Sometimes it was the red, sometimes the blue component which was widened. It seemed possible that one might have here components of two very close lines whose separations differed but little in magnitude. The width of some of the undisturbed *p*-components sometimes suggested the same thing. But the latter might be close doublets which would separate with stronger fields. The no-field plates actually showed some of these to be two lines. A no-field line shaded to one side might suggest the presence of other lines also, but this is too common an occurrence with spectral lines to be definite. If one could omit all of these there were still lines which showed this action for sharp no-field lines. It might appear that the broadened line was going to separate into two lines with stronger field, leaving an unequal number of components on the two sides

of the zero position. One could only answer this possibility by photographing with very strong fields. It is not implausible, because there are cases found in thorium where the number of components on the two sides of the zero position do not balance. One component of one line which is unseparated for the weaker field strength is double for the 20 per cent stronger field. That it is such a splitting is certain because the mean of the two separations is symmetrical with the separation of the opposite component.

In one small region of the spectrum (Table XIX) I found it necessary to make accurate measurements of wave-length, from line to line, to make sure of identification. I have recorded these lines as measured, although Exner's and Hascek's tables are more accurate than my measurements. However, lines are often shifted by small amounts, and these lines were peculiar in other respects (see discussion, Table XIX). Hence there might be cause for the shift, and I have, therefore, not hesitated to record them as read. There can, in general, be no question as to the identity of these lines, unless it be for lines not given in Exner's and Hascek's tables. There were many of the latter, and it may be an error to call them all thorium. Many of them possess peculiarities in common with lines which are certainly thorium in the list. There was no special effort made to find impurities, but lines due to calcium, iron, strontium, and lead are present, and none of these impurities behave peculiarly. Some of the strong lines of Exner's and Hascek's tables are omitted because of their weakness, but they are generally omitted because of the confusion due to overlapping components of other lines, leaving the components a blurred mass.

The following abbreviations have been used: *s*- and *p*- as already explained; *r*, red; *b*, blue; λ , wave-length; *d*, or *diff.*, diffuse; *O*, order; *o*, overlap; *i*, intensity; *a*, normal separation; *A*, approximate separation; $\Delta\lambda/\lambda^2$ change in wave-frequency per cm., and therefore a positive value, means a displacement toward the blue end of the spectrum. The normal separation corresponds to a value of 1.105 for a field intensity of 24450 lines to the square cm., used in my previous contribution and checked here from the separations of the calcium lines. If the strength of field is in

error, corrections may be made if needed when physicists are decided upon the accuracy and magnitude of these magnetic fields:

PART II. GENERAL DESCRIPTION OF THE TABULATED
MEASUREMENTS

Tables I–XI inclusive contain symmetrical lines exclusive of the triplets.

Table I consists of two 14-component lines. The interior *s*-components are too weak to be very positive of their presence. The exterior *s*-components are diffuse, and not capable of measurement with desirable accuracy. The *p*-components agree very closely for the two lines. This fact, and the general appearance of the components, leads to the conclusion that they are duplicates. The separations are shown as multiples of .17, and these agree as closely as could be expected for the *p*-components. The value .17 does not appear to be an aliquot part of the normal *a*, for $a/6$ gives .184 and $a/7$, .158.

Table II contains two 12-component lines, which are evidently not related. The components of 4086.71λ are related in a simple way. All are probably multiples of .214. This differs little from $3a/16$, which is not an aliquot part of *a*. The readings may also be represented about as well by multiples of $a/11$, which is one of Runge's aliquots of *a*. The former value gives a distance from component to component for the *s*-separations of $4 \times .214$, and the same value for the *p*-components. The latter, $a/11$, gives uniform spacings for the *s*-components; but for the *p*-components we have $8a/11$ once, and $9a/11$ twice for the spacings. There can be scarcely a doubt but that the components are equally spaced and that the value is the same for both *s*- and *p*-. This leads to the rejection of the aliquot interval value, $a/11$.

Table III gives two 11-component lines. They are not duplicates, but a multiple relationship holds for the components of each line. The repeated values are not rational parts of *a*.

Table IV contains two 10-component lines. They are not duplicates and a simple relationship in the components is not apparent.

Table V has one 9-component line. The inner pair of s -components is $a/2$, but the other components are not related to it.

Table VI has three 8-component lines and all differ. A relationship of the components is not apparent.

Table VII contains one 7-component line.

Table VIII contains seven 6-component lines. There are no duplicates; and there are only three separations in the different lines which correspond to a or multiple aliquot parts thereof. For line 4178.2λ the components are (4, 3, 2) times $.262$, with deviations respectively of $+.012$, $-.006$, and $-.004$, while (4, 3, 2) times $a/4$ would give deviations of $-.05$, $-.05$, and $-.03$ respectively. Such deviations in a set of reading are certainly exclusive.

Table IX contains seven 5-component lines and no duplicates.

Table X contains 166 quadruplets. The first row gives the s - and the second the p -components. Each separation represents both a positive and a negative value. Under intensities the first recorded refers to the red, the second to the blue component. If the components are of equal intensities only one value is recorded. In overlaps the intensity, of course, arises from the red component of one, and the blue component of the other line. There are several duplicates, but among these duplicates I have found no series. It is difficult to tell just when these lines may be duplicates. They shade off by small values toward separations which are quite different. In the triplets of yttrium and zirconium I found the values to progress by almost insensible increments from very small to very large separations, and if there were distinct types there was no separating them. The thorium quadruplets behave in the same way, particularly if one includes the unsymmetrical quadruplets. The quadruplets, however, have a p -, as well as an s -separation, which gives one a double chance to isolate types. We may choose the p -separation equal to $a/2$ ($.553$) and find it represented in lines 4017.65λ , 3730.12λ , 3670.12λ , 3470.08λ , 3445.87λ , and 3324.88λ . The corresponding s -separations for these lines are respectively 1.06 , 1.28 , $.52$, 1.29 , 1.07 , and $.83$. Here are evidently two pairs. The value $.83$ ($=3a/4$) is the only one related to a . Similarly, if one were to

choose lines corresponding to either of these s -separations, one would find the p -components to have as great a variety in their separations. There are a number of the s -separations reasonably near to the value a , but very few, however, of the corresponding p -components come near to aliquot parts of a . These relations suggest that there is no particular meaning to be attached to a "normal" separation among these quadruplets. None of these separations approach reasonably near to the quadruplet principal series, neither were there representatives of the companion sextuplet series. There are lines having the s - and other lines having the p -separation of the same magnitude as the quadruplet principal series, but no lines having both components coincidentally.

Table XI contains a list of sixty p -doublets. The intensities follow the order of Table X. The weakest of these lines do not appear upon the s -plates, and only upon one set of p -plates. On account of overlapping, it was impossible to make out the character of the separations for some s -components, and impossible to measure others. Some s -components were too diffuse to measure. It is safe to say that most of these lines are quadruplets. On account of the wide variation in the magnitude of these p -separations it would be no easier to arrange and classify them than a similar number of triplets. If one may add the greater portion of them to the quadruplets, they increase the already large variation of these components and make it more improbable that there is any standard in the magnitudes of these separations.

Tables XII–XVI inclusive contain a list of unsymmetrical lines exclusive of triplets.

Table XII is an unsymmetrical 9-component line. There are two red and one blue p -components. The latter is double the inside red component. The remaining red component has the value of the "normal" triplet, but it is not related in a simple way to the other p -separations, nor to the separations of the s -components.

Table XIII is an unsymmetrical 7-component line. Both p - and s - are unsymmetrical; but the strong undisplaced p -component is the only one which can be measured with desirable accuracy.

Table XIV gives four 6-component lines. The footnotes indicate their principal features.

Table XV contains seven 5-component lines. At least six of these are unsymmetrical with respect to the p -component only. Line 4115.85λ has its components in the ratio of (0, 1, 3, 4) times .417. The first three values represent the unsymmetrical p -components and the latter the symmetrical pair of s -components. In the p -components of 3938.86λ one finds (0, 2, 3) times .41, which is practically the same interval as in the previous line. The s -components of this line are not related to this interval. However, we may combine both p - and s -components together as multiples of the interval $a/11$. We then have (0, 8, 12, 14) times $a/11$. Applying this interval to the previous lines gives larger discrepancies in the readings. In line 3709.82λ the s -components are nearly in the ratio of one to two in separation and in the ratio of three to one in intensity.

Table XVI contains thirty-three quadruplets. Twenty-four of these have unsymmetrical p -, and fifteen unsymmetrical s -components. There are six of these lines "lop-sided," i. e. there are more components on one side of the middle than on the other. For three of these lines, 4619.67λ , 4318.65λ , and 4105.55λ , the mean of the two separations upon one side is symmetrical with the position of the third component upon the other side of the middle. This is probably also true for 4050.02λ , but does not hold for 4036.22λ . The distance between these two components is very different for these lines. For line 4619.67 the two s -components on the one side do not appear separated on the weaker field plate, but present the appearance of a broadened line. There are one to two, one to three, two to three, and three to four ratios represented in the separations of components, which are usually expected to have equal values. Some of these ratios are represented more than once, but then the lines are unlike because the ratio factors must be multiplied by different magnitudes to produce the observed separations. Two lines which have the same magnitude of separation in p - or s - usually have quite different magnitudes in their respective s - or p -components, as was noted in the symmetrical quadruplets. This greatly reduces the possibility of duplicates.

Table XVII contains a list of symmetrical triplets. In the column of intensities the red component appears first, the unseparated *p*-component next, and the blue *s*-component last. These lines are further illustrations of the fact that there are no appreciable steps in the value of triplets. When they approach each other so closely in magnitude, it is scarcely possible to isolate lines of a certain magnitude of separation and intensity and group them into series or related lines. Under such circumstances it would be much less meaningless to say that lines of similar types repeat themselves from substance to substance, and therefore infer a similarity of the substances. The same is true to a less degree with the quadruplets. A few like separations of any type¹ are useless for comparing similar chemical substances or for inferring a similarity of chemical behavior. However, these like separations have an important bearing upon that very subject, because they are natural starting points from which to begin the search for a connected relationship in the separations. Only when such relationships repeat themselves from substance to substance can one confidently assert that a similarity in the substances exists.

In such a diversity of separations, it might seem that small errors in the measurements for these triplets would, if corrected, throw them into groups differing by a small but appreciable amount. So that the actual number of separations would be small in number and possibly related to one another in some simple way, or even related to a normal value. There are some well-defined lines which have a separation of 1.07 to 1.08. Do these belong to the normal triplet whose separation is 1.105 or are they a class by themselves? I selected some of the sharpest and easiest measures of these lines and subjected them to renewed measurements upon plates of both field strengths, and was not able to change their value. I similarly treated a few lines with separations about 1.04, 1.14, and 1.18 and with a similar result. The whole could be answered satisfactorily with five times the accuracy in measurement.

¹Purvis, *Trans. Camb. Phil. Soc.* XX, no. VIII, p. 193; and *Proc. Camb. Phil. Soc.* XIII, pt. VI, p. 325; XIV, pt. I, p. 41; XIV, pt. III, p. 217.

There is a characteristic of these triplets that is impressive. One may choose a line with almost any magnitude of separation, and not far from it find one or more lines which have practically identical separation. The following seven lines lie in a small bundle upon the plates. Four of these, and possibly six, are duplicates. These lines are 4383.69λ to 4374.96λ inclusive (see table). There is another bundle between 4286.90 and 4283.25 with three lines alike. The photographic plates suggest many such bundles or groups. Naturally, other types than triplets may be present in these bundles. These at once suggest those recurring groups in those substances in which series have been found. This fact, together with the numerous close companions having like separations, would suggest that hope for relationship among the thorium lines was not forlorn.

Table XVIII is a list of unsymmetrical triplets not included in Table XIX. Stronger exposure may reveal other components for 3294.76 . The line as recorded is uncommon rather than unsymmetrical. The s -component is in the zero position and the p -components separated.

Table XIX contains a list of lines in a very small portion of the spectrum. The spark spectra was obtained from thorium chloride upon carbon electrodes. About 3885λ a carbon band begins whose lines are troublesome for some distance. As usual, I was omitting these lines of zero separation, but found that I was omitting many lines from Exner's and Hascek's tables. Close measurement of some of these unseparated lines showed that they agreed so closely with the tabulated wave-lengths which I was omitting that there could be no doubt as to their identity. Those which were found separated were unsymmetrical. Unseparated lines are supposed to arise from compounds. The carbon band lines which are unseparated are attributed to cyanogen. A few of the lines in this region Exner and Hascek mark cyanogen. However, all but one of these show separation. Many not attributed to cyanogen fail to show any separation whatsoever. These may be due to compounds, but it is only conjectural. Their behavior is generally very peculiar. In my study of zirconium, I noted that most of the lines of zero separation looked like unre-

solved types, which would probably separate with stronger field. The unresolved lines of thorium have generally a different appearance, and most of them are probably of an inseparable type. There are a few of these lines distributed throughout the spectrum, but the most of them are found in the small region of Table XIX.

Comparison of the intensities of the *s*- and *p*-components with the corresponding no-field lines showed that there was no uniformity in their ratio to the intensities of no-field lines, and therefore no uniformity in their ratio to each other. It is a well-known fact that the exposure of the plates must be many times longer when the spark is in the magnetic field. Possibly, it is equally well known that the relative intensities of the lines change in the magnetic field. This is attributed to the change in the character of the spark. In the simplest theory of the triplet the *s*-component is supposed to be half the intensity of the *p*-component. Observation shows cases where the intensities are the reverse. When one considers an unseparated line, the simplest assumption would be that the field would change *p*- and *s*-components relatively the same, and that the intensity of the vibrations parallel and perpendicular to the lines of force would be the same. However, in comparing the *p*- and *s*-components with the no-field line intensities and with each other, the ratio of their intensities was found to vary in the same way as observed in the triplets. From a comparison of many lines one might infer that the *p*-exposures are at least 25 per cent stronger than the *s*-exposures. But here, one may assume any value less than twofold, for the relative exposure of the *p*- and *s*-plates, and then will find only a small number of the lines to have equal intensity for both *s*- and *p*-exposures. The inference seemed to be that the lines were not vibrating with equal intensity parallel and perpendicular to the lines of force. I soon found there was a tendency for some of these lines to group themselves into pairs, i. e. for one line there was a greater luminosity perpendicular to the lines of force than parallel thereto, and for an adjacent line or close companion the phenomenon was reversed. This reminds one of the close companionship of many of the triplets. There are cases where sev-

eral of these lines may be associated in close groups. Some of these groups have *s*- and *p*- nearly equal. Other groups will have *p*- stronger than *s*- or vice versa. The behavior of these lines led to placing them in a separate table (Table XIX), and to record the intensities for the no-field lines (designated "no f") as well as the intensities of the *p*- and *s*-components. Special citations from this table would be scarcely necessary unless one could collect them into definite, well-defined, and related groups. A further characteristic is that this list of lines begins very suddenly at its red end, near the beginning of the carbon band. The blue end of the list is nearly reached at 3700λ , but there seem to be a few scattering lines belonging to the class as far as 3656λ . There are very few symmetrically separated lines toward the red end of the group, but before reaching the end of the group the symmetrical lines predominate.

There were some of these lines of zero separation which did not seem to have exactly the same position upon the no-field *s*- and *p*-plates. The lines upon the no-field plates were, in general, exceptionally sharp. But these unsymmetrical lines were always broadened. Take lines 3864.04λ and 3751.22λ . When the corresponding *p*- and *s*-components are compared with each other, one sees an appreciable difference in position. When they are compared with the corresponding no-field lines, the *s*-components fall upon one side and the *p*-components upon the other side of these broad lines. Two adjacent lines, 3870.30λ and 3870.13λ , have the *s*-components of the former displaced toward the red, and of the latter displaced toward the blue. The no-field lines are again broad in both cases, and the *s*- and *p*-components sharp. Also, these *s*-components do not fall outside of the no-field line. Some other illustrations might be taken from the table. The error naturally increases here, and one should not attach much importance to the recorded values of the lateral displacements. But that there are displacements of some of the *s*- and *p*-components without separation, as well as a variation in the ratio of their respective intensities from line to line, seems probable. This same broadness or diffuseness upon one side occurs for a few no-field lines which are found to have one of the corresponding *s*-components broader

than the other. This action suggests that one has here a pair of close double lines differing but slightly in separation.

Table XX gives a few (38) scattering unseparated lines. There seem to be some easily recognized pairs and groups here. In the table, the pairs are shown in small brackets, and the groups in large brackets. The lines not included in the brackets are more scattered. For the shorter wave-lengths there is increasing probability of small separations escaping one's notice.

GENERAL REMARKS.—It is among the lines which have several components that duplications are most easily recognized. It is also easy to recognize their repetition from substance to substance. But this might be misleading. For if the magnitudes of the separations for a particular number of components change with increased number of lines they ultimately differ by only small amounts, then one certainly would have separations found in other substances, and a type, therefore, could have no particular meaning. This is too well known among triplets to need comment. It is also true in thorium quadruplets. There are in this substance a number of lines whose separations are reasonably similar to separations which I found in yttrium and zirconium. With such a list of quadruplets and such diversity of separation as found in thorium, it is rather surprising, however, that no quadruplet was found which approached reasonably near to the magnitude of the separation in the quadruplet principal series.

With the lines having five or more components in thorium there are few duplications, and as the number of components increases, the number of representatives of the different types correspondingly decreases. So that there is practically no chance to apply Preston's law in these lists.

As found by myself and others, and in particular by Runge, the successive separations in these several component's lines are, for each particular line, multiples of small values called 'intervals,' which Runge¹ first showed were multiples of aliquot parts of a normal separation. In thorium these small intervals are not as near to aliquot parts of the normal a as one should desire for

¹*Phys. Zeit.* 8, p. 15, 1907.

accurate confirmation of such a relationship. But the multiple relationship is frequently very easily recognized.

PART III. CONCLUSIONS

1. Lines which have six or more components in thorium are relatively very few. The separations of a great many of these are multiples of small values. But these small values are not closely related to aliquot parts of a "normal" separation.

2. There are numerous lines unsymmetrical both in separation and in intensity. The stronger component is always least displaced.

3. There are a few lines with an unequal number of components upon the two sides of the zero position.

4. There are a great many lines unsymmetrical in intensity, which fail to show any dissymmetry in position.

5. The components are often unsymmetrical in width, i. e. one component is sharp and its opposite companion is broad. Some of the latter look as if they might separate with stronger field and give lines of the type in conclusion 3.

6. There are numerous lines unseparated in the magnetic field, but very peculiarly affected thereby. Some of them vibrate more strongly perpendicular to the lines of force than parallel thereto, and others vice versa. Some of these are possibly related in pairs. Others may belong in groups.

7. Numerous triplets have one or more close companions of like separation, which suggest pairs and groups of closely related lines.

8. There is often a multiple relationship in the magnitude of the separations of unsymmetrical components. This would be merely a coincidence, if the dissymmetry is independent of the field strength or proportional to the square of the same.

9. The types of separations for lines which have several components are not repetitions of types which I had found in other substances. Reasons are given for excluding triplets and quadruplets from such a comparison.

TABLE I

λ 4282.20			λ 4116.91		
<i>i</i>	$\Delta\lambda/\lambda^2$	A	<i>i</i>	$\Delta\lambda/\lambda^2$	A
5.....	(-2.26) <i>s</i>	(14×.17)	7.....	-2.37 <i>s</i>	(14×.17)
1—.....	..... <i>s</i>		1—.....	—..... <i>s</i>	
1—.....	..... <i>s</i>		1—.....	—..... <i>s</i>	
1—.....	-1.22 <i>p</i>	(7×.17)	1.....	-1.19 <i>p</i>	(7×.17)
1.....	— .87 <i>p</i>	(5×.17)	2.....	— .86 <i>p</i>	(5×.17)
2—.....	— .54 <i>p</i>	(3×.17)	3.....	— .50 <i>p</i>	(3×.17)
2.....	— .17 <i>p</i>	(1×.17)	3.....	— .17 <i>p</i>	(1×.17)
2.....	+ .17 <i>p</i>		3.....	— .17 <i>p</i>	
2.....	+ .51 <i>p</i>		3.....	+ .51 <i>p</i>	
1.....	+ .86 <i>p</i>		2.....	+ .85 <i>p</i>	
1.....	+1.22 <i>p</i>		1.....	+1.20 <i>p</i>	
.....	+..... <i>s</i>		1—.....	+..... <i>s</i>	
.....	+..... <i>s</i>		1—.....	+..... <i>s</i>	
5.....	(+2.26) <i>s</i>		7.....	+2.37 <i>s</i>	

TABLE II

λ 4086.71			λ 4019.30		
<i>i</i>	$\Delta\lambda/\lambda^2$	A	<i>i</i>	$\Delta\lambda/\lambda^2$	A
5.....	+ 2.83 <i>s</i>	13×.214	5.....	+1.99 <i>s</i>	?
3.....	+ 1.95 <i>s</i>	9	3.....	+1.45 <i>s</i>	
4.....	+ 1.25 <i>p</i>	6	1+.....	+ .89 <i>s</i>	
1.....	+ (1.05) <i>s</i>	5	8.....	+ .80 <i>p</i>	
5.....	+ .42 <i>p</i>	?	1.....	+ .40 <i>s</i>	
1—.....	+ (.16) <i>s</i>	?	6.....	+ .35 <i>p</i>	
1—.....	— (.16) <i>s</i>	?	6.....	— .34 <i>p</i>	
5.....	— .41 <i>p</i>	4× <i>a</i> /11	.....	+..... <i>s</i>	
1.....	— (1.05) <i>s</i>	10	8.....	+ .80 <i>p</i>	
3.....	— 1.26 <i>p</i>	13	.....	+..... <i>s</i>	
3.....	— 1.95 <i>s</i>	19	.....	+..... <i>s</i>	
4.....	— 2.83 <i>s</i>	28	5.....	+1.99 <i>s</i>	

TABLE III

λ 4142.87			λ 3434.09		
<i>i</i>	$\Delta\lambda/\lambda^2$	A	<i>i</i>	$\Delta\lambda/\lambda^2$	A
1.....	-2.25 <i>p</i>	10 \times .226	2.....	-2.36 <i>s</i>	7 \times 0.34
5.....	-1.35 <i>p</i>	6	1.....	-... <i>s</i>	
2.....	-1.34 <i>s</i>	6	3.....	-1.04 <i>p</i>	3
1.....	-0.68 <i>s</i>	3	1.....	-... <i>s</i>	
1+.....	-0.47 <i>p</i>	2	4.....	-0.34 <i>p</i>	1
1.....	0.00 <i>s</i>		1.....	... <i>s</i>	0?
1.....	+0.47 <i>p</i>		4.....	+0.34 <i>p</i>	
.....	+0... <i>s</i>	0	1.....	+... <i>s</i>	
2.....	+1.32 <i>s</i>		3.....	+1.03 <i>p</i>	
.....	+1.35 <i>p</i>	0	1.....	+... <i>s</i>	
1.....	+2.36 <i>p</i>		2.....	+2.36 <i>s</i>	

TABLE IV

λ 4094.99			λ 3929.74		
<i>i</i>	$\Delta\lambda/\lambda^2$	A	<i>i</i>	$\Delta\lambda/\lambda^2$	A
1+.....	-1.51 <i>s</i>	?	3.....	-1.01 <i>s</i>	?
2+.....	-0.92 <i>s</i>		4.....	-0.84 <i>p</i>	
10.....	-0.78 <i>p</i>		1.....	-0.73 <i>s</i>	
1+.....	-0.41 <i>s</i>		5.....	-0.27 <i>p</i>	
1.....	-0.36 <i>p</i>		1.....	-... <i>s</i>	
1.....	+0.36 <i>p</i>		.....	+... <i>s</i>	
1+.....	+0.41 <i>s</i>		5.....	+0.28 <i>p</i>	
10.....	+0.78 <i>p</i>		.....	+... <i>s</i>	<i>sb</i> diffuse
2.....	+0.96 <i>s</i>		3.....	+0.83 <i>p</i>	
1.....	+1.51 <i>s</i>		.....	+... <i>s</i>	

TABLE V

λ 3704.16		
<i>i</i>	$\Delta\lambda/\lambda^2$	A
1.....	-2.08 <i>s</i>	?
1.....	-1.33 <i>s</i>	
1.....	-0.70 <i>p</i>	
1.....	-0.56 <i>s</i>	
1+.....	0.00 <i>p</i>	
1.....	+0.57 <i>s</i>	
2.....	+0.73 <i>p</i>	
.....	+... <i>s</i>	
.....	+... <i>s</i>	
.....	+... <i>s</i>	

TABLE VI

λ 4277.49			λ 4180.15		
<i>i</i>	$\Delta\lambda/\lambda^2$	A	<i>i</i>	$\Delta\lambda/\lambda^2$	A
1.....	-1.50 <i>s</i>	?	5.....	-... <i>s</i>	Brd. poss. 2 or 3 comps.
2.....	-0.97 <i>s</i>		3.....	-1.44 <i>p</i>	
12.....	-0.70 <i>p</i>		1.....	-1.08 <i>p</i>	
1.....	-0.46 <i>s</i>		1-.....	-(?) <i>p</i>	
1.....	+0.46 <i>s</i>		1-.....	+(?) <i>p</i>	
10.....	+0.70 <i>p</i>		1.....	+1.09 <i>p</i>	o
2.....	+0.99 <i>s</i>		3.....	+1.44 <i>p</i>	
1.....	+1.50 <i>s</i>		.....	+... <i>s</i>

λ 3649.90		
<i>i</i>	$\Delta\lambda/\lambda^2$	A
1+.....	-2.86 <i>s</i>	?
1-.....	-... <i>s</i>	
1.....	-1.20 <i>p</i>	
2.....	0.00 <i>p</i> ^s	
1-.....	+1.20 <i>p</i>	
.....	+... <i>s</i>	
1+.....	+2.86 <i>s</i>	

TABLE VII

λ 3792.52		
<i>i</i>	$\Delta\lambda/\lambda^2$	A
3.....	-1.94 <i>s</i>	?
1.....	-1.33 <i>p</i>	
1.....	-1.05 <i>s</i>	
12.....	0.00 <i>p</i>	
1.....	... <i>s</i>	
1.....	+1.33 <i>p</i>	
3.....	+1.94 <i>s</i>	

TABLE VIII

λ 4448.00		λ 4202.02		λ 4182.15*	
<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$
1+	-1.82 <i>s</i>	1-	-0.84 <i>p</i>	.....	- ?
6.....	-0.77 <i>s</i>	4.....	-0.69 <i>s</i>	6.....	-1.10 <i>s</i>
10.....	-0.55 <i>p</i>	2.....	-0.27 <i>p</i>	10.....	-0.79 <i>p</i>
8.....	+0.56 <i>p</i>	2.....	+0.28 <i>p</i>	8.....	+0.79 <i>p</i>
5.....	+0.76 <i>s</i>	4.....	+0.69 <i>s</i>	4.....	+1.11 <i>s</i>
1.....	+1.87 <i>s</i>	1.....	+0.83 <i>p</i>	.....	+ ? <i>s</i>

*The external pair of components may belong to other lines, which would leave this line a quadruplet.

λ 4178.20		λ 4069.40		λ 3549.83	
<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$
3.....	-1.06 <i>s</i>	8.....	-1.22 <i>s</i>	1+	-1.92 <i>s</i>
10.....	-0.78 <i>p</i>	2.....	-0.50 <i>p</i>	1.....	-0.83 <i>s</i>
1.....	-0.52 <i>p</i>	4.....	-0.18 <i>p</i>	6.....	-0.60 <i>p</i>
1.....	+0.52 <i>p</i>	4.....	+0.18 <i>p</i>	5.....	+0.60 <i>p</i>
10.....	+0.78 <i>p</i>	3.....	+0.50 <i>p</i>	1.....	+0.83 <i>s</i>
3.....	+1.06 <i>s</i>	8.....	+1.23 <i>s</i>	1.....	+1.92 <i>s</i>

λ 3338.00*	
<i>i</i>	$\Delta\lambda/\lambda^2$
6.....	-1.81 <i>s</i>
1.....	-0.89 <i>p</i>
1+	-0.36 <i>p</i>
1+	+0.32 <i>p</i>
1.....	+0.90 <i>p</i>
6.....	+1.80 <i>s</i>

*The *p*-components are measured in the second order and *s*-components in the first order.

TABLE IX

λ 4624.22		λ 4499.13*		λ 4369.50†	
<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$
1.....	-(1.89) <i>s</i>	1.....	-(1.53) <i>s</i>	2.....	-2.07 <i>s</i>
2.....	-0.41 <i>p</i>	1+	-(0.43) <i>p</i>	1.....	-0.98 <i>p</i>
3.....	0.00 <i>p</i>	2.....	0.00 <i>p</i>	5.....	0.00 <i>p</i>
2.....	+0.41 <i>p</i>	1.....	+(0.43) <i>p</i>	1.....	+0.98 <i>p</i>
1.....	+1.89 <i>s</i>	1.....	+(1.89) <i>s</i>	2.....	+2.07 <i>s</i>

* The *s*- are diffuse inward and probably other components are present.

† The *s*- are diffuse and the *p*- have diffuse background.

λ 3892.40		λ 3872.51*		λ 3842.10†	
<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$
1.....	-1.91 <i>s</i>	.....	- <i>s</i>	12....	1.75 <i>s</i>
4.....	-0.66 <i>p</i>	.....	- <i>p</i>	2.....	1.38 <i>p</i>
5.....	0.00 <i>p</i>	1.....	0.00 <i>p</i>	30....	0.00 <i>p</i>
3.....	+0.66 <i>p</i>	5.....	0.57 <i>p</i>	1+....	1.40 <i>p</i>
1.....	+1.91 <i>s</i>	3.....	1.30 <i>s</i>	12....	1.75 <i>s</i>

* *pr* and *sr* are overlapped.

† The middle *p*- may be double.

λ 3589.47*	
<i>i</i>	$\Delta\lambda/\lambda^2$
.....	- ...
1.....	-0.55 <i>p</i>
1+....	0.00 <i>p</i>
1.....	+0.57 <i>p</i>
.....	+ ... <i>s</i>

* The *s*- are both overlapped.

TABLE X

λ	i	$\Delta\lambda/\lambda^2$	REMARKS	λ	i	$\Delta\lambda/\lambda^2$	REMARKS
4689.33	1+, 1	.67		4357.79	2	1.29	
	2, 1	.29			3	.80	
12.06	1	1.14		44.50	5, 6	1.13	
	2, 1+	1.07			10, 12	.59	
03.05	1, 1-	1.03		34.11	2	1.35	
	2, 1+	.59			3	.67	
4540.60	1+, 2	1.04		32.09	1+, 2	1.18	
	5	.55			3, 2	.42	
31.90	1+, 2	1.18		28.86	3	1.25	<i>sr o</i>
	4, 5	.55			3, 2	.34	
4493.57	2, 2	1.00		27.30	1, 2	1.09	
	6, 5	.86			1, 2	.43	
92.02	1, 1+	(1.24)		10.19	3	1.18	*
	1+, 1+	(.28)			4, 2	.19	
74.25	2, 4	1.25		4297.53	1, 1+	1.23	
	5, 4	.53			2, 3	.64	
58.17	1, 1+	.86		78.50	1+	.96	
	5, 3	.55			2, -	.49	
39.26	7, 8	1.04		74.19	4	.83	<i>sr o</i>
	12, 10	.50	<i>sb probably o</i>		4	.42	
36.40	10, 1+	(.96)	<i>sr o</i>	67.68	1+, 1	(1.81)	<i>pr probably o</i>
	2, 2	.96			4, 2	.79	
26.18	2, 2	1.35		65.27	1	(1.60)	
	5, 3	.49			2, 3	1.54	
09.10	3, 2	1.27		56.25	2	.65	
	4, 5	.49			2	.42	
01.87	2, 2	1.50		33.41	4	1.30	
	4, 5	1.22			6, 4	.71	
4374.08	4, 4	1.18	<i>pr o by 4.33</i>	29.58	4	1.29	
	8, 4	.56			8	.94	

TABLE X—CONTINUED

λ	i	$\Delta\lambda/\lambda^2$	REMARKS	λ	i	$\Delta\lambda/\lambda^2$	REMARKS
4195.04	1, 1+	(.148)		4085.22	8	1.13	
88.75	1, 1-	(.91)		15	15	.78	
82.15	1	(1.72)		77.89	1-, 1+	(1.29)	
72.52	6, 4	(1.08)		68.15	3	.28	
68.81	10, 8	1.11		55.00	1, 2	(2.14)	
48.35	6	.79		53.08	1	(1.14)	
40.42	3, 2+	1.32	<i>p</i> 2d <i>O</i>	41.36	1	(1.76)	
36.53	3	.15	2d <i>O</i>	32.69	3, 4	(.59)	
32.95	5	(1.16)	2d <i>O</i>	41.00	2	(1.30)	
31.60	3, 3	.61	2d <i>O</i>	29.13	4, 5	1.06	
31.20	5, 4	.73	2d <i>O</i>	27.82	2	1.18	
23.72	5, 3	.19	2d <i>O</i>	26.30	6, 5	(.13)	2d <i>O</i>
08.61	5, 3	1.16	2d <i>O</i>	17.65	2, 5	(.66)	<i>sb</i> <i>O</i>
04.60	5, 3	.20	2d <i>O</i>	01.22	8, 5	(.90)	<i>pr</i> <i>O</i>
4093.60	5, 4	1.33	2d <i>O</i>	3982.23	5, 4	1.20	<i>p</i> 2d <i>O</i>
	1	.85	2d <i>O</i>	81.28	4, 5	.40	<i>s</i> <i>O</i>
	1	(.12)	2d <i>O</i>		4, 5	(1.13)	
	12, 10	1.25	2d <i>O</i>		..	(.24)	
	3	.36	<i>p</i> 2d <i>O</i>		2	(1.23)	
	4, 5	1.27	<i>p</i> 2d <i>O</i>		1	.50	
	1, 1+	.19	<i>p</i> 2d <i>O</i>		3, 2	1.21	
	4, 3	(.25)	<i>p</i> 2d <i>O</i>		2	.26	
	1, 1+	1.03	<i>p</i> 2d <i>O</i>		1+	(1.06)	
	8	.33	2d <i>O</i>		2	.56	
	10, 12	1.33	2d <i>O</i>		1	(1.10)	
	4	.82	2d <i>O</i>		3	.83	
	3	1.17	<i>p</i> 2d <i>O</i>		1, 2+	1.27	<i>sb</i> <i>O</i> , <i>pb</i> <i>O</i>
	5, 4	(.17)	<i>p</i> 2d <i>O</i>		3, 4	1.42	<i>p</i> > <i>s</i>
	1		<i>p</i> 2d <i>O</i>		6, 8	1.36	possibly each
					10..	.78	s-doublet

TABLE X—CONTINUED

λ	i	$\Delta\lambda/\lambda^2$	REMARKS	λ	i	$\Delta\lambda/\lambda^2$	REMARKS
3979.20	2, 3	1.20		3832.87	..	+1.28	r components lost in 3, 10
	4, 3	.76			..	+ .65	r components lost in 0.93 $p=s$
74.38	1+	1.35		30.70	1+	(+1.33)	
	4, 3	.67			..	+1.31	
67.52	2, 3	1.26	p possibly unsymmetrical	21.57	4, 3	1.00	
	6, 4	.32	p 2d O	02.65	8, 6	.36	2d O
64.96	1	(1.27)			1	(.64)	
	2	.30			1	(.65)	$p=s$
63.33	3	1.26		3773.94	2, 3	1.06	$sb\ o$
	3	.72			6, 5	.33	2d O
57.24	1+, 1	(1.32)		63.04	6	.80	
	2+, 2	.60			2	.63	2d O
37.14	8, 8	1.07		50.82	1, 1+	1.18	
	10, 8	.53	†		3	1.14	$p=s$
51.25	.., 1	(+2.10)		47.73	8	1.04	
	1, 3	.41			12	(.24)	2d O
13.95	1	(.95)		46.68	1	(.98)	
	2+, 2	.67			1	(.59)	
12.41	3	1.18		41.40	20	1.15	
	4, 3	.45			30	.39	2d $O\ dr$
08.03	1+, 1+	(1.33)		31.60	3	1.41	
	2, 1+	.98			2, 3	.47	s broad possibly double 2d O
00.25	1+, 2	1.41		30.92	5	1.28	
	1+, 2	.45	2d O		8	.54	
3894.53	1	1.50		28.04	2	1.30	
	1+	.84			3	.50	$sb\ o$
59.98	10, 12	1.19		20.52	2, 6	(1.18)	$s, 1st\ O\ sr\ o$
	8, 6	.38	2d O		7	.64	p 2d O
58.72	2	.50		18.02	5, 3	(1.46)	
	1	(.60)	$p>s$		2, 1	(.20)	

TABLE X—CONTINUED

λ	i	$\Delta\lambda/\lambda^2$	REMARKS	λ	i	$\Delta\lambda/\lambda^2$	REMARKS
3707.60	1, 1+	(1.79)		3642.41	4, 5	1.13	p 2d O
	2	1.29			4, 3	.72	s
00.95	8,	1.23		39.55	5, 3	.79	2d O
	2+, 3	.63			7, 5	.40	
3698.47	1	.41		21.25	8	1.02	2d O
	1+, 2	.38	Probably $p=s$		8, 6	.20	
98.30	1	(+1.34)	sr o	20.52	1	1.32	2d O
	3	.84			3, 2	.32	
94.08	6, 10	1.31		15.26	10, 8	1.30	2d O
	12, 8	.69			8, 6	.20	
90.67	3	1.26		14.16	1+, 2	1.06	2d O
	5, 3	.50			5, 3	.33	
87.80	1+	(1.11)	p 2d O	12.57	2	1.08	2d O
	1-, 1	(.30)			6, 5	.75	
70.12	2	.52		07.52	1, 1+	1.33	
	2	.57	Probably $p=$		2	.66	
67.13	1-, 1	(1.43)		3598.31	6, 5	.87	p 2d O
	2	.86			2	(.18)	
65.90	1+	1.03		92.92	7, 5	1.16	p 2d O
	2	.47			1+, 2	.29	
62.80	1	(1.69)		82.15	8, 10	1.29	p 2d O
	1+	.71			5, 3	.20	
62.36	1	(1.38)		72.52	2	1.19	2d O
	1+	.83			5, 3	.33	
59.66	8	1.26	2d O	59.55	4	1.98	2d O
	15, 12	.62			6, 5	.38	
52.31	5	+1.18	pr o	16.96	3, 2	1.40	sr O
	12, 10	.63			5, 3	.67	
47.75	4, ..	(1.31)		16.50	3	1.16	p 2d O
	12, 10	1.00			1	(.24)	

TABLE X--CONTINUED

λ	i	$\Delta\lambda/N^2$	REMARKS	λ	i	$\Delta\lambda/N^2$	REMARKS
3514.70	5	1.18		3445.87	3, 2	1.07	
	2, 1+	.29	<i>p</i> 2d <i>O</i>		5, 3	.54	
13.38	1	(1.33)		41.16	2	1.30	<i>p</i> 2d <i>O</i>
	1	(.63)				.51	
09.33	1	(1.19)	2d <i>O</i>	39.07	3	1.30	2d <i>O</i>
	1, 3	(.70)	||		5, 4	.33	
00.70	1, 2	(1.52)		25.28	4, 3	1.18	
	2, 1+	(.65)			3	(-.57)	
00.15	3	1.55		19.29	2, 3	1.29	2d <i>O</i>
	7, 5	.86			6, 5	.50	
3499.15	3, 2	1.28		14.59	1+	.91	
	5, 4	.70			4, 3	1.04	<i>p</i> > <i>s</i>
97.41	1	(1.10)		11.92	4	1.05	
	1+	(1.48)			1	.38	<i>p</i> 2d <i>O</i>
73.21	1+, 3	1.42		09.37	4	1.08	
	3	.60	||		2, 1+	.36	<i>p</i> 2d <i>O</i>
71.40	1+	1.36		08.76	3	1.33	
	3	.74			2, 1	.38	<i>p</i> 2d <i>O</i>
70.08	7	1.29		3395.50	2	1.16	
	15	.55	2d <i>O</i>		2, 1+	.68	
65.88	12	.93	2d <i>O</i>	89.77	3, 2	.93	
	15, 12	.88	Probably <i>p</i> = <i>s</i>		5, 4	.86	
54.83	1	(1.30)		86.64	1	1.31	2d <i>O</i>
	2	.51			4, 3	.75	
54.35	1	(1.10)		79.84	1	(1.15)	
	3	.33			1	(.45)	
52.81	6	1.75		78.70	2, 2+	1.39	2d <i>O</i>
	4, 3	.63	<i>p</i> 2d <i>O</i>		4, 3	.34	
49.77	5	1.22		67.93	3, 2	1.01	
	3	.69	<i>p</i> 2d <i>O</i>		5, 2	.26	2d <i>O</i>

TABLE X.—CONCLUDED

λ	i	$\Delta\lambda/\lambda^2$	REMARKS	λ	i	$\Delta\lambda/\lambda^2$	REMARKS
3364.79	4	1.45		3290.25	2, 1+	1.33	
	3	.61	<i>p</i> 2d <i>O</i>		2, 1+	.67	<i>p</i> 2d <i>O</i>
55.38	1+	(-.94)		86.71	4	1.71	
	2, 3	1.05			3, 2+	(.18)	<i>p</i> 2d <i>O</i>
49.10	5	1.26		67.14	1+, 3	1.30	
	1	.30	<i>p</i> 2d <i>O</i>		3	.85	
48.93	2	.78		45.91	5, 4	1.46	<i>p</i> 2d <i>O</i>
	1	.28	<i>p</i> 2d <i>O</i>	25.51	3, 2	.61	
47.72	1	(1.68)			2	1.28	<i>p</i> 2d <i>O</i>
	1	(.89)		13.71	3, 2+	.37	<i>p</i> 2d <i>O</i>
35.17	2	(1.34)			1+	(.84)	
	1	(.61)	<i>p</i> 2d <i>O</i>		1, 1+	(.48)	<i>p</i> 2d <i>O</i>
34.72	3	(1.34)		3150.56	3, 2	1.34	
	8, 7	.67	<i>p</i> 2d <i>O</i>		1+, 1	(.35)	<i>p</i> 2d <i>O</i>
24.88	1+	.83					
	5, 4	.35	2d <i>O</i>				

*The line does not appear on no-field plates, but comparison of *s*- and *p*- plates *pr* lies almost in the middle and the deviation largely due to the *pb* component. It might be another line.

†The *s*-components of this line are broad, and each may consist of three.

‡The *p*- and *s*- are in the ratio of 1 to 2. The *s*- is like its companion triplet line 3938.01. The magnitude of the separation suggests the normal triplet 1.11. A retest was made since these were easily measured lines, but it was not possible to increase the value 1.07;

if anything, the value is a trifle smaller.

§The second order no-field line is just off the plate. In the first order the lines show dissymmetry, but are too thick to measure. The line is probably unsymmetrical.

|| This line does not show on no-field plate. When the *p*-components are compared with the *s*-components they do not appear symmetrical.

¶ Juxtaposition of *p*- and *s*-plates shows that the measured difference in the value of *p*- and *s*- is actually present and not an error of measurement.

TABLE XI

λ	i	$\Delta\lambda/\lambda^2$	REMARKS
4740.72	4	1.14	s broad, apparently not separated, possibly double
4612.71	1	.32	
4588.40	3	.52	6 components
4472.47	1, 2	.31	
69.75	2, 1	.31	
02.49	1+, 1	.79	
4388.59	1, 1+	1.19	Probably $p > s$
87.27	2, 1	(.71)	
61.91	2+, 2	.76	
02.25	2, 1+	.62	
4256.42	2	(.51)	
47.73	1, 2	(.66)	
37.25	1+, 2	(.84)	
35.59	2	1.41	
17.37	1+, 2	1.38	
4166.70	1+	(1-.90)	
	1	(+1.13)	
4158.71	3	(-.17)	
	2	(1+.22)	
4107.41	2	1.31	
4087.46	1	(.50)	
70.86	1+, 1	.37	
45.74	1	(1.23)	
29.80	3	.66	
16.48	2	1.04	
03.21	.. 4	+30	Quadruplet sr and pr lost in 03.39
3969.15	1+	(.51)	
81.70	1	.80	
53.53	2	.49	
52.60	1	.41	
45.96	3	.58	
45.27	2	.56	
42.95	2	1.44	
42.75	2	1.01	
3937.14	4, 3	.51	2d $O, s o$
36.07	1+, 1	.57	
12.05	1-, 1+	.50	
3698.47	2	.40	
86.03	1	1.01	
76.88	1+, 1	.62	
75.05	2	1.60	
58.32	1+, ..	-.64	o 8.20
58.20	.. 3	+47	
50.75	3	.73	
48.28	1	.54	
24.57	1	.89	
06.32	1-, 1+	.90	
3556.45	1+	1.00	

TABLE XI—CONCLUDED

λ	i	$\Delta\lambda/\lambda^2$	REMARKS
3516.96	5 , 3	.67	
3406.35	1 , 1—	(.36)	
3385.16	1	(1.26)	$p > s$
3295.44	1+, 1	.50	
62.79	8	1.29	2d O^*
48.62	1 , 2	.80	2d O
3193.29	2 , 1	.54	2d O
90.25	3 , 2	.81	2d O
42.76	2	.77	1st O
24.47	3 , 2	.84	2d O
17.75	1	(.53)	2d O
10.12	2 , 1	.83	2d O
3035.21	1	(.32)	2d O
3002.51	1	.53	2d O

*The s - is very peculiar. It is spread over a field about 40 per cent wider than the p - separation.

TABLE XII

λ 3722.06

i	$\Delta\lambda/\lambda^2$
2.....	+1.59 s
2.....	+ .99 s
8.....	+ .90 p
2.....	+ .38 s
2.....	- .32 s
2.....	- .45 p
2.....	-1.02 s
6.....	-1.11 p
1+.....	-1.62 s

TABLE XIII

λ 3959.38

i	$\Delta\lambda/\lambda^2$
1.....	-2.00 s
1.....	-1.42 p
1.....	- .80 s
5.....	0. p
1.....	+ .98 s
1+.....	+1.23 p
1+.....	+1.87 s

TABLE XIV

λ 4295.25*		λ 3998.01†		λ 3828.58‡	
<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$
1.....	-2.45 <i>p</i>	—.....	... <i>s</i>	2.....	-1.63 <i>s</i>
1.....	-1.94 <i>s</i>	—.....	... <i>s</i>	1.....	-.90 <i>s</i>
5.....	-1.11 <i>s</i>	12.....	-.66 <i>p</i>	7.....	-.55 <i>p</i>
12.....	0. <i>p</i>	10.....	+.97 <i>p</i>	5.....	+.45 <i>p</i>
7.....	+1.11 <i>s</i>	—.....	.. <i>s</i>	2.....	+.96 <i>s</i>
1.....	+1.77 <i>p</i>	—.....	.. <i>s</i>	1.....	+(1.30) <i>p</i>

*The outside pair of *p*- may be foreign. In second order the zero *p*- is diffuse on the red, looking like a companion weak line. No-field plate line is also diffuse on the red. The middle of the *s*- was assumed to be midway between the two stronger components. If there are two lines here the principal one is a symmetrical triplet and the weaker one a symmetrical quadruplet with the separation of *p*- greater than *s*-.

†There are four if not six components in each of the *s*-.

‡The outer blue component possibly belongs to the adjacent line.

λ 3678.19*	
<i>i</i>	$\Delta\lambda/\lambda^2$
1+....	-2.20 <i>s</i>
2.....	-1.36 <i>s</i>
10.....	-.26 <i>p</i>
4.....	+.26 <i>p</i>
4.....	+.88 <i>s</i>
2.....	+2.08 <i>s</i>

*On no-field plate second order there are two lines, unless it is reversal which should have shown in first order. Exner and Hascek give but one line. Supposing it two lines, the inner pair of *s*- are symmetrical with the stronger line (or red *p*-), but one is at loss to know how to dispose of the outer pair of *s*-.

TABLE XV

λ 4342.45		λ 4115.85		λ 4100.57	
<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$
1—...	-(1.56)? <i>s</i>	2.....	-1.66 <i>s</i>	2.....	-1.64 <i>s</i>
6.....	1-1.11 <i>s</i>	2.....	-.84 <i>p</i>	2.....	-.52 <i>p</i>
12.....	-.54 <i>p</i>	2.....	0.00 <i>p</i>	1+....	0.00 <i>p</i>
5.....	+.80 <i>p</i>	1+....	+.42 <i>p</i>	3.....	+.69 <i>p</i>
6.....	+1.10 <i>s</i>	2.....	+1.66 <i>s</i>	3.....	+1.64 <i>s</i>

TABLE XV—CONTINUED

λ 4075.92		λ 3938.86		λ 3822.33	
<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$
2.....	— .80 <i>s</i>	3.....	—1.39 <i>s</i>	6.....	—1.03 <i>s</i>
3.....	—1.27 <i>p</i>	3.....	—1.23 <i>p</i>	4.....	— .85 <i>p</i>
3.....	0.00 <i>p</i>	1.....	0.00 <i>p</i>	2.....	— .17 <i>p</i>
3.....	+ .95 <i>p</i>	8.....	+ .81 <i>p</i>	2.....	+1.12 <i>p</i>
1+.....	+ .80 <i>s</i>	4.....	+1.39 <i>s</i>	3.....	+1.33 <i>s</i>

λ 3709.82	
<i>i</i>	$\Delta\lambda/\lambda^2$
1.....	—(1.55) <i>p</i>
1.....	—(.97) <i>s</i>
5.....	0.00 <i>p</i>
3.....	+ .50 <i>s</i>
—.....	+ ? <i>p</i>

TABLE XVI

λ 4619.67		λ 4352.87		λ 4347.40	
<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$
1+....	—1.17 <i>s</i>	3.....	—1.35 <i>s</i>	2.....	—1.62 <i>s</i>
2.....	—1.04 <i>s</i>	12.....	— .51 <i>p</i>	4.....	— .43 <i>p</i>
10.....	0.00 <i>p</i>	4.....	+1.03 <i>p</i>	1+....	+ .81 <i>p</i>
5.....	+1.11 <i>s</i>	3.....	+1.35 <i>s</i>	2.....	+1.62 <i>s</i>

λ 4318.65		λ 4165.92		λ 4164.43	
<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$
5.....	—1.45 <i>s</i>	1.....	—(1.05) <i>s</i>	5.....	—1.18 <i>s</i>
10.....	0.00 <i>p</i>	3.....	— .99 <i>p</i>	4.....	— .71 <i>p</i>
3.....	+ .89 <i>s</i>	4.....	+ .76 <i>p</i>	3.....	+ .44 <i>p</i>
1.....	+2.00 <i>s</i>	1.....	+(.88) <i>s</i>	3.....	+1.18 <i>s</i>

TABLE XVI—CONTINUED

λ 4105.55		λ 4060.05		λ 4050.02	
i	$\Delta\lambda/\lambda^2$	i	$\Delta\lambda/\lambda^2$	i	$\Delta\lambda/\lambda^2$
2.....	-1.31 <i>s</i>	1.....	-(1.03) <i>s</i>	3.....	-1.59 <i>s</i>
1.....	-.76 <i>s</i>	1.....	-(.70) <i>p</i>	8.....	0.00 <i>p</i>
8.....	0.00 <i>p</i>	2.....	+(.36) <i>p</i>	1.....	+.84 <i>s</i>
6.....	+1.04 <i>s</i>	1.....	+(1.03) <i>s</i>	1.....	+2.44 <i>s</i>

λ 4036.22		λ 4027.15		λ 3993.86	
i	$\Delta\lambda/\lambda^2$	i	$\Delta\lambda/\lambda^2$	i	$\Delta\lambda/\lambda^2$
1.....	-1.73 <i>s</i>	2.....	-1.15 <i>s</i>	1.....	-(1.10) <i>s</i>
1.....	-.55 <i>s</i>	3.....	-.27 <i>p</i>	1+	-(.38) <i>p</i>
6.....	0.00 <i>p</i>	2.....	+.38 <i>p</i>	1.....	-(.76) <i>p</i>
3.....	+1.84 <i>s</i>	2.....	+1.15 <i>s</i>	1.....	+(1.10) <i>s</i>

λ 3955.28		λ 3895.55*		λ 3873.56	
i	$\Delta\lambda/\lambda^2$	i	$\Delta\lambda/\lambda^2$	i	$\Delta\lambda/\lambda^2$
1+.....	-1.53 <i>s</i>	8.....	-1.02 <i>s</i>	2.....	-.66 <i>s</i>
5.....	-.74 <i>p</i>	5.....	-.11 <i>p</i>	5.....	-.31 <i>p</i>
3.....	+1.38 <i>s</i>	2.....	+.23 <i>p</i>	1.....	+.96 <i>p</i>
2.....	+1.48 <i>p</i>	8.....	+1.02 <i>s</i>	1.....	+1.30 <i>s</i>

*The *s*- measured in first, the *p*- in second order.

λ 3867.42		λ 3866.21		λ 3842.69	
i	$\Delta\lambda/\lambda^2$	i	$\Delta\lambda/\lambda^2$	i	$\Delta\lambda/\lambda^2$
1.....	-.38 <i>s</i>	7.....	-.60 <i>s</i>	2.....	-1.25 <i>s</i>
3.....	-.42 <i>p</i>	3.....	-.82 <i>p</i>	2.....	-.38 <i>p</i>
1+.....	+1.32 <i>p</i>	6.....	+.46 <i>p</i>	1.....	+.76 <i>p</i>
1.....	+.38 <i>s</i>	3.....	+1.26 <i>s</i>	1.....	+1.56 <i>s</i>

TABLE XVI—CONTINUED

λ 3838.01		λ 3827.07		λ 3815.95*	
<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$
2.....	-1.54 <i>s</i>	1.....	-.66 <i>s</i>	3.....	-.53 <i>s</i>
4.....	0.00 <i>s</i>	3.....	-.80 <i>p</i>	5.....	-.19 <i>p</i>
12.....	0.00 <i>p</i>	5.....	+.52 <i>p</i>	1.....	+1.68 <i>p</i>
3.....	+1.70 <i>s</i>	2.....	+.38 <i>s</i>	1.....	+1.73 <i>s</i>

*The components of intensity 1 might belong to line 3815.78, the blue components of which are visible. The latter would then be unsymmetrical. If this were accepted then one has no blue components for this stronger line.

λ 3814.12		λ 3813.79*		λ 3790.10†	
<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$
1.....	-(.90) <i>s</i>	—.....	— .— <i>s</i>	5.....	-.51 <i>s</i>
1.....	-(.79) <i>p</i>	3.....	-.40 <i>p</i>	—.....	-0.00 <i>p</i>
1.....	+(.79) <i>p</i>	1.....	+.53 <i>p</i>	2.....	+.68 <i>s</i>
2.....	+(.32) <i>s</i>	3.....	+1.31 <i>s</i>	1.....	+.98 <i>s</i>

*Exner gives 3813.85 for this line which would make the dissymmetry greater.

†The *sr* is overlapped by *sb* of 3790.26.

λ 3783.15*		λ 3778.00†		λ 3776.10	
<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$
—.....	-(1.13) <i>s</i>	3.....	-.27 <i>s</i>	4.....	-1.08 <i>s</i>
8.....	-.51 <i>p</i>	2.....	-.27 <i>p</i>	6.....	-1.08 <i>p</i>
6.....	+1.00 <i>p</i>	1.....	+.94 <i>p</i>	5.....	+1.59 <i>p</i>
6.....	+(1.13) <i>s</i>	1.....	+1.16 <i>s</i>	3.....	+1.55 <i>s</i>

*The *sr* is overlapped. Exner's 3783.27 not found. Could this be it?

†It seemed that the weak blue components might belong to some other line, which would leave *s*- and *p*- identical in position but only with red components.

TABLE XVI—CONTINUED

λ 3775.47		λ 3771.80*		λ 3770.25	
<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$
1—....	-1.05 <i>s</i>	3.....	-1.05 <i>s</i>	—....	-(1.17) <i>s</i>
2.....	-.57 <i>p</i>	2.....	-.91 <i>p</i>	6.....	-.65 <i>p</i>
1.....	+.85 <i>p</i>	1—....	+(1.81) <i>p</i>	4.....	+.95 <i>p</i>
2.....	+.48 <i>s</i>	1—....	+(1.55) <i>s</i>	3.....	+.55 <i>s</i>

*An overlap on *pb*. The *sb* is broad, possibly double. Its middle measures as given. It is certainly unsymmetrical.

λ 3751.90*		λ 3712.80		λ 3617.88† -	
<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$
1—....	-(...) <i>s</i>	2.....	-1.36 <i>s</i>	1—....	-... <i>s</i>
1.....	0.00 <i>s</i>	3.....	-1.30 <i>p</i>	2.....	-1.02 <i>p</i>
2.....	0.00 <i>p</i>	5.....	+.59 <i>p</i>	1.....	+2.04 <i>p</i>
1.....	+1.46 <i>s</i>	2.....	+1.36 <i>s</i>	1—....	+... <i>s</i>

*This line may be symmetrical. The *sr* is diffuse.

†The *s*- is diffuse but smaller than *p*-.

TABLE XVII

λ	$\Delta\lambda/\lambda^2$	REMARKS	λ	i	$\Delta\lambda/\lambda^2$	REMARKS
4761.3	.99		4525.04	1	(1.17)	<i>sr o</i> broad
52.6	1.82		16.20	1+	1.27	
40.72	0.	<i>s.7</i> Aengstroms	12.70	1	1.34	
24.92	(1.25)		10.73	15	1.08	
23.93	.94		00.21	1+	1.37	
18.79	1.31		4496.53	4	1.35	
06.41	(1.35)		92.45	2	1.01	
05.92	(.98)		88.83	5	1.30	
00.35	.88		87.07	6	1.45	
4694.67	(1.45)		65.52	10	1.68	
94.25	.98		61.91	2	1.18	
91.25	1.37		61.28	2	1.25	
51.76	1.12		55.20	1+	(1.00)	
40.26	(.65)	<i>sb o</i>	54.62	2	.90	
39.86	(1.23)	<i>sr o</i>	43.30	1+	(1.28)	
31.94	.98		41.95	8	1.64	
25.24	.99		36.20	1	(.99)	
09.53	.65		33.12	10	.95	
4589.31	(1.30)		27.85	1+	1.45	<i>b</i> wider than <i>r</i>
81.78	1.10		16.40	3	.76	
66.85	(1.02)		10.60	1	1.38	
63.48	1.19		08.61	1	(1.29)	
44.70	.83		00.56	1	(1.08)	
37.86	1.31		4399.25	4	1.09	
34.30	.65		98.10	3	.87	
33.50	1.46		96.67	2	.81	
32.47	.64		95.09	5	1.23	
29.67	—	Too weak	93.28	2	1.27	
27.93	—	Too weak	91.30	30	1.43	
25.31	(1.14)	<i>sb o</i> broad	83.69	1+	1.28	

TABLE XVII—CONTINUED

λ	i	$\Delta\lambda/\lambda^2$	REMARKS	λ	i	$\Delta\lambda/\lambda^2$	REMARKS
4382.10	25, 50, 25	1.11		4313.17	5, 7, 3	1.42	
81.61	10, 5	+		07.40	2, 5, 1+	1.77	
78.34	1+, 5, 1+	1.11		06.57	1+, 7, 2	1.70	
77.50	2+, 8, 2+	1.14		00.98	1, 3, 1	(.78)	
75.77	1, 5, 1	1.12		4299.98	3, 8, 2	1.09	
74.96	6, 15, 6	1.11		98.80	3, 8, 5	.76	
67.12	1, 4, 1	1.18		91.95	1, 5, 1+	(1.12)	
66.08	2, 5, 2	1.74		90.52	1, 4, 1+	(1.14)	
62.55	1, 4, 1	(1.34)		88.23	1, 5, 6	0.	s sharp center with background diffuse; in width .45 Aengstrom
61.50	6, 10, 4	1.15	sb broad				
59.58	1+, 4, 1+	1.08					
58.70	2, 8, 2	1.12					
55.50	1, 12, 1	.86		86.90	2, 4, 2	1.17	
53.55	4, 12, 4	0.	s .45 Aengstroms	86.38	3, 8, 3	1.17	
51.64	1+, 5, 2	1.21		85.38	2, 4, 2	.72	
51.00	4, 12	0.	s .45 Aengstroms	85.15	4, 8, 4	.86	
49.21	1+, 3, 1+	1.55		83.70	6, 10, 8	1.35	
48.73	2, 4, 2	1.08		83.25	1, 3, 1	(1.17)	
46.59	1+, 5, 2	1.07		74.51	2, 4, 2	1.15	
41.22	6, 15, 6	1.00		73.54	10, 20, 10	1.53	
38.30	1+, 4, 1	(1.00)		71.26	1+, 1+, 1	(.95)	
37.55	8, 15, 8	1.15		70.49	3, 5, 4	1.96	
36.70	1-, 3, 1	(1.92)		64.52	1, 3, 1+	1.26	
35.89	2, 8, 2	1.21		64.23	1, 2, 1	(.78)	sv 0
29.65	2, 8, 2	1.20		63.50	4, 7, 4	1.18	
20.77	2, 10, 2	(1.54)		62.90	1, 4, 1	(1.32)	
20.64	3, 1, 3		so	61.64	1, 3, 2	(.86)	sb 0
20.31	3, 2, 8	.23	o	61.38	2, 1+, 1	(.88)	sv 0
18.71	3, 8, 2	.92		60.47	3, 4, 2	1.66	Broad
15.52	1, 5, 1	.85		57.58	2+, 4, 2	.76	

TABLE XVII—CONTINUED

λ	i	$\Delta\lambda/\lambda^2$	REMARKS	λ	i	$\Delta\lambda/\lambda^2$	REMARKS
4254.60	2, 4, —	(1.62)	This line and three following give by overlaps only five components	4214.15	1, 1, 1	(1.59)	
54.09	—, 4, —	(1.08)		13.21	2, 4, 1+	.79	
53.66	—, 4, 3	(1.11)		11.60	4, 8, 4	1.18	
50.53	6, 15, 6	1.13		11.05	2, 6, 2	.73	
49.80	2, 10, 2	.78		10.84	1, 2, 1	.71	
48.10	8, 15, 8	1.02		09.01	25, 50, 25	1.16	
44.05	3, 10, 3	1.26		06.83	2, 5, 2	1.31	
42.84	1, 3, 1+	(1.00)		4199.18	1, 3, 1+	2.05	
40.67	2, 5, 2	1.53		96.02	7, 12, 2	1.63	<i>sr o</i>
35.12	2, 2, 1+	(1.09)		95.72	3, 10, 4	1.35	
34.40	1, 2, 1—	(1.05)	94.27	2, 2, 2	1.16		
30.57	1, 3, 1	(1.38)	93.15	4, 5, 3	1.11		
27.49	1, 3, 1	(1.50)	92.03	4, 5, 2	1.20		
26.00	1, 3, 1	(1.59)	84.48	1+, 5, 2	.81		
24.75	1, 4, 3	(1.22)	79.86	8, 15, 6	1.25		
24.37	3, 6, 2	(1.35)	74.59	1, 2, 1	(1.52)		
22.93	1, 5, 1	(1.00)	74.15	2, 2, 2	(1.83)	Prob. <i>sr</i> and <i>sb o</i>	
22.65	1, 2, 1	(.98)	73.70	2, 2, 2	(1.35)	Prob. <i>sr o</i>	
20.23	4, 8, 4	1.12	71.00	2, 6, 6	(1.20)	<i>sb o</i>	
19.54	1—, 2, 1	(.93)	70.65	6, 10, 4	(1.23)		
18.69	3, 10, 4	1.02	67.45	1, 3, 1	(1.10)		
18.34	2, 8, 2	(.80)	63.84	5, 15, 5	1.46		
16.19	2, 5, 3	(1.10)	62.87	10, 15, 10	(1.43)		
			59.82	5, 12, 5	1.32		
			56.69	10, 25, 12	(.90)	<i>sb o</i>	
			56.35	12, 6, 4	(.53)	<i>sr o</i>	
			50.17	12, 30, 12	1.30		
			42.63	6, 20, 4	1.68	See 40.42	
			41.82	3, 10, 4	1.12		
			38.97	1+, 3, 2	1.11		

TABLE XVII—CONTINUED

λ	i	ΔN^2	REMARKS	λ	i	ΔN^2	REMARKS
4135.64	1	1.19		4973.15	1+	(2.41)	s- diffuse
34.27	5	1.90		67.78	1	(1.98)	
30.44	1	1.11		64.50	1	(.74)	
27.60	3	1.02		63.59	5	1.30	
22.06	1	1.27		59.66	3	1.29	
18.77	1	1.83		57.99	2	(1.30)	sr o
13.77	1+	1.18		57.52	3	(1.53)	sr and sb o
12.52	2	1.63		57.23	1+	(.91)	s ₁ broad, sr o
11.05	4	1.58		55.43	1+	(1.15)	Probably sr o by
			sr look double in	51.10	4	(1.33)	1.30
			2d O				
08.01	1	1.34		48.60	2	1.64	
06.60	1	1.91		48.18	1	(1.50)	
06.14	3	1.28		43.51	2	1.28	sb o 3.20
03.90	1	(1.16)	sb o	39.98	1+	(1.23)	sb o
03.41	2	(1.42)	sr o	39.53	1+	(1.47)	
01.60	1+	1.85		37.40	3	1.08	
01.08	8	1.23		36.71	8	.66	
4999.13	5	1.36		35.10	2	(1.73)	
97.93	1+	(1.35)	Sharp sb o	34.36	5	1.73	
97.52	1+	(1.87)	Diffuse sr o	33.99	1-	(1.16)	
91.53	3	(1.75)	sr o	32.82	1	(1.70)	sb o sb of 2.69
89.35	1	(1.35)	sb o	31.47	2	1.20	
88.91	3	(1.20)	sr o	30.49	1	(.61)	
82.49	2	(1.01)	sb o	30.00	1	(.74)	
82.04	4	(1.69)	sr o	28.83	4	(1.27)	sr o
81.54	2	(1.92)		27.48	5	(1.30)	sr and sb o
80.47	1	(1.04)		26.30	4	(1.21)	sr o
79.77	2	1.24		25.78	6	.97	
74.84	2	1.21		22.23	5	1.00	
73.92	1+	1.16					

TABLE XVII—CONTINUED

λ	i	$\Delta\lambda/\lambda^2$	REMARKS	λ	i	$\Delta\lambda/\lambda^2$	REMARKS
4018.27	1	1.35		3972.30	4	1.75	
16.02	1+	1.18		69.70	6	(1.05)	<i>sb o</i>
13.34	1	1.20		69.47	7	(1.05)	<i>sr o</i>
12.67	8	1.44		67.37	3	(1.70)	
11.95	5	1.31		67.10	2	(.77)	
09.26	5	1.18		66.34	8	(.91)	<i>sr o 7.52</i>
08.35	2	2.09	<i>s- are broad</i>	62.49	1	1.22	
07.18	15	1.24		61.71	1+	(1.31)	
06.51	3	1.43		60.50	3	1.37	
05.09	5	1.43	<i>s- are broad</i>	56.80	2	.38	
03.49	6	.87		56.70	5	.76	
01.88	1+	1.16					These two lines are not separated on <i>p-</i> plates, nor by Exner and Haseck.
00.46	1	(1.02)					
00.10	1+	(1.18)					
3997.00	..	+1.29	<i>sr o</i>	54.57	1	(1.11)	
96.20	7	1.66		51.66	8	1.75	
94.70	12	.70		50.53	8	.96	
94.49	..	+1.08		49.06	10		
93.86	1-	(1.10)		47.48	2	1.26	
92.45	3	(1.34)	<i>sb o</i>	46.30	12	—	<i>o by 5.96</i>
92.21	3	(1.12)	<i>sr and sb o</i>	42.20	2	1.16	
91.89	2	(1.55)		38.01	6	1.08	See quad. 37.14
88.19	7	1.10	<i>sb o</i>	36.45	3	1.52	
87.88	..	+1.18		35.74	3	.69	
86.81	1+	.89		35.32	1	(1.47)	
80.00	..	+ .97		33.00	2	1.67	
86.26	2	1.88		32.35	3	(.84)	<i>sb o</i>
76.56	5	1.76	<i>s- are broad</i>	32.10	5	(.96)	<i>sr o</i>
75.36	1+	1.24		31.35	1	(1.82)	<i>s broad</i>
73.36	2	1.33					

TABLE XVII—CONTINUED

λ	i	$\Delta\lambda/\lambda^2$	REMARKS	λ	i	$\Delta\lambda/\lambda^2$	REMARKS
3927.54	4, 10, 4	1.27		.....	.....	.....
27.24	2, 8, 2	2.02		3795.16	2, 6, 2	†	
25.19	5, 10, 5	1.30		04.92	—, 1, 1	†	-.75
22.34	2, 5, 2	1.47		03.04	3, 6, 3	.....	†
21.53	1, 2, 2	1.41		.....	.....	.....
20.41	3, 15, 3	(1.91)*		3696.82	2, 5, 2	.....	1.09
19.19	2, 6, 3	(1.83)	Four lines here which overlap.	96.15	5, 10, 5	.....	1.08
18.62	3, 7, 2	(1.79)	Three are probably identical	92.71	2†, 6, 2†	.....	1.18
18.13	2, 7, 8	(1.79)	in separation.	92.24	3, 5, 3	.....	(1.09)
16.90	8, 15, 8	(1.26)		.....	.....	.....	†
14.60	1—, 3, 1	1.52		88.93	10, 20, 10	.....	1.50
13.15	3, 8, 3	1.37		88.40	1—, 2, 1†	.....	(1.12)
11.45	1, 1, 1	(1.18)		88.15	1†, 2, 4	.....	(1.19)
05.44	1, 1, 1	1.27		87.13	1†, 2, 1	.....	(1.10)
05.29	8, 12, 8	1.42		83.50	1†, 2, 1—	.....	(.61)
04.21	3, 10, 3	1.50		82.06	2, 4, 2	.....	(2.02)
00.99	10, 10, 8	(1.33)		81.38	1†, 3, 1	.....	(.89)
3898.60	3, 5, 2	(1.11)	<i>sr o</i> and <i>sb o</i>	79.89	12, 20, 12	.....	1.72
93.55	2, 1, 2†	(1.84)	<i>sr o</i>	.....	.....	.....	.....
93.17	2†, 2, 2	(1.24)	<i>sb o</i>	75.72	8, 15, 8	.....	1.12
91.18	4, 10, 4	1.12	<i>sr o</i>	73.97	6, 15, 6	.....	1.15
87.54	1†, 3, 3	(1.82)	<i>sb o</i>	71.72	2, 4, 2	.....	1.21
87.08	3, 6, 3	(1.29)	<i>sr o</i>	70.21	3, 8, 5	.....	(1.78)
86.12	1†, 2, 1	(1.29)	<i>sr o</i>	68.31	1†, 4, 1	.....	(.85)
84.96	8, 15, 8	1.09	<i>sb</i> wider than <i>sr</i>	63.88	12, 15, 12	.....	1.16
84.67	3, 5, 3	1.06		-61.74	2, 7, 1†	.....	1.05
.....	.....	.....		57.70	1—, 2, 1	.....	(1.06)
3706.96	6, 12, 6	1.52		56.84	1, 3, 1—	.....	(1.16)

* On no-field there are two lines, 0.54 and 0.41, intensities 1 and 4 respectively. Probably run together on *p*-. On *s*-there is a broad doublet symmetrical with 0.41.

† Lines omitted here appear in Table XIX.

TABLE XVII—CONTINUED

λ	i	$\Delta\lambda/\lambda^2$	REMARKS	λ	i	$\Delta\lambda/\lambda^2$	REMARKS
3652.69	5, 15, ..	-1.14	<i>sb o</i> 2.31 a quad. with same <i>s</i> -separation	3624.90	8, 12, 3	(1.04)	<i>sb</i> probably <i>o</i> by 7.15 and 6.85
51.72	1, 3, 1	(1.52)		24.12	3, 6, 4	1.28	
50.95	4, 10, 6	1.76		19.85	1+, 3, 1+	(.82)	
49.37	12, 25, 12	.85		18.48	1, 4, 1+	(1.31)	
48.55	3, 5, 3	1.20		17.22	12, 15, 12	(1.19)	
47.45	3, 5, 3	(1.59)		16.85	.., 3, 1+	+(1.33)	
44.84	1+, 3, 1+	1.81		15.47	1, 2, ..	-(1.00)	
44.48	1+, 4, 1+	1.37		14.51	1, 3, ..	-(1.27)	
43.62	1, 4, 1	1.50		13.91	.., 4, 3	+(1.39)	
41.74	1, .., 1	1.17		13.02	1, 2, 1	(2.63)	
	1+, .., 1+	1.48		10.94	2, 8, 2	1.43	
38.42	2, 5, 2	1.66		10.55	2, 8, 2	1.28	
37.68	1+, 5, 1+	1.32	10.20	3, 6, 3	1.53		
36.70	5, 8, 3	1.03	09.60	20, 25, 20	1.22		
36.05	3, 12, 3	1.22	09.34	.., 8, 3	+		
35.40	2, 8, 3	1.83	05.78	3, 8, 3	1.42		
34.70	4, 10, 4	1.08	04.17	3, 8, 2	1.52		
34.34	1, 5, 1+	.96	03.49	2, 8, ..	-1.39		
32.94	1, 5, 1	(1.20)	03.32	8, 15, 8	1.56		
32.74	1+, 4, 2	1.88	01.20	10, 25, 10	1.20		
29.36	1+, 3, 2	1.03	3599.86	1+, 1, 2+	(1.19)		
26.05	6, 10, 12	(1.44)	99.45	2, 4, 2	(1.66)		
25.74	12, 15, 8	(1.55)	95.72	1, 3, 3	(1.06)		
25.20	2, 2, ..	-(1.15)	95.40	3, 5, 3	(1.53)		
25.05	3, 12, 3	(1.22)	94.20	1, 2, 1	1.41		
			93.96	7, 10, 7	1.65		
			91.55	1, 5, 12	.90		
			91.16	3, 8, 2	.88		
			88.35	3, 8, 3	1.35		

TABLE XVII—CONTINUED

λ	i	$\Delta\lambda/\lambda^2$	REMARKS	λ	i	$\Delta\lambda/\lambda^2$	REMARKS
3585.16	5	.96		3550.47	3	.92	$p-o$
84.28	3	1.39		47.60	2	(1.23)	
83.16	3	1.24		46.41	1	(1.06)	p - not observed
81.57	1	(1.18)		46.13	2	(1.51)	$sr o$ 6.41
81.35	3	(1.31)		41.80	5	1.29	
80.36	4	1.75		39.75	12	(1.26)	
79.45	10	.98		39.37	20	(1.26)	
78.27	1+	1.33		38.90	1+	(1.06)	p - nearly the width of s -separation
77.34	1	.72					interior all exposed s -very weak compared to p .
76.68	5	1.18		38.37	1	(1.10)	Same holds for 8.90
75.43	12	1.07					
73.64	1	(.98)					
73.35	6	1.55					
71.70	3	1.73					
70.21	1	1.33					
68.10	2	1.81					
67.83	2	.92		37.30	8	.76	
67.37	2	.69		36.80	1+	(.95)	
67.16	2	1.19		32.08	2	(1.11)	$sr o$
65.52	4	1.60		31.80	5	(1.02)	sr and $sb o$
65.24	1	(1.19)		31.61	2	(1.25)	
64.83	4	1.16		30.72	1	(1.19)	
63.48	1	1.18		29.06	10	1.18	
61.87	2	1.14		22.09	10	1.38	
60.95	1	.95		15.89	1+	1.44	
60.08	8	1.13		15.13	2	1.46	
55.21	3	.94		10.91	1	1.20	
53.23	7	1.21		10.69	1	1.01	
52.03	1	(1.08)		07.72	3	1.03	
51.55	1	(1.34)		07.00	2	1.59	

TABLE XVII—CONTINUED

λ	i	$\Delta\lambda/\lambda^2$	REMARKS	λ	i	$\Delta\lambda/\lambda^2$	REMARKS
3505.62	5	1.20		3473.97	1-	(1.45)	
04.20	1-	(1.15)		69.50	1+	1.48	
03.75	5	1.29	Probably <i>o</i> by 3.93	68.36	8	1.10	
02.94	5	1.77		65.17	1	(1.83)	
01.61	5	1.29		64.58	1	(1.14)	
00.45	3	1.19		63.86	7	(1.21)	
3498.15	3	1.43	<i>st</i> <i>o</i> by 8.15	63.00	10	.76	
97.85	3	(1.36)	<i>st</i> <i>o</i> 7.41 which see	61.37	4	.97	
97.19	3	(1.16)	<i>sb</i> <i>o</i> 6.94	61.20	4	+(1.28)	
96.94	1-	(1.22)		55.40	1	(1.48)	
96.19	1-	(1.42)	<i>sb</i> <i>o</i>	53.68	1	(1.08)	
95.90	2	(1.38)	<i>st</i> <i>o</i>	51.85	1+	(1.40)	
93.70	8	1.38		51.13	2	(1.33)	<i>sb</i> <i>o</i> 0.90
93.43	1	1.14		49.42	2	1.31	
91.75	1+	1.24		45.34	5	1.30	
90.67	5	(1.56)	<i>sb</i> <i>o</i> and weaker	44.15	1+	1.25	
90.42	3	(.90)	<i>st</i> <i>o</i> and weaker	43.25	1	(.54)	<i>s-</i> are broad
88.00	3	1.39		42.72	1	(1.16)	
87.15	1	-(1.31)	<i>sb</i> <i>o</i>	41.49	2	1.69	
86.67	12	1.21	<i>st</i> <i>o</i>	39.83	12	1.27	See 41.16 and 39.07
85.25	4	(.91)	<i>st</i> <i>o</i>	37.42	3	1.26	
84.25	1+	1.62	<i>st</i> <i>o</i>	37.13	1+	1.75	<i>sb</i> <i>o</i>
79.33	4	.66		36.80	3	1.27	<i>st</i> <i>o</i>
78.60	2	1.78		36.05	15	1.51	
78.28	3	1.18		34.86	3	1.45	
77.84	1	1.76		31.95	4	1.48	
76.70	5	1.14		31.16	1	(1.24)	
75.71	1	1.14		30.03	4	.91	
74.46	1	1.33		29.53	3	1.18	
				29.10	2	1.38	

TABLE XVII—CONTINUED

λ	i	$\Delta\lambda/\lambda^2$	REMARKS	λ	i	$\Delta\lambda/\lambda^2$	REMARKS
3426.04	4, 5, 3	1.19		3377.57	1, 3, 1	1.27	
23.24	3, 6, 2	.98		76.98	1+, 3, 1+	1.61	
22.75	1+, 5, 1+	1.32		75.12	2, 4, 1+	1.42	
21.34	8, 15, 6	(.98)		74.73	5, 10, 3	1.20	
18.89	6, 12, 5	.75		73.68	1, 2, 1-	1.19	
16.54	1, 2, 1	1.52		72.85	2, 3, 1	1.30	
16.03	1-, 2, 1	(1.14)		71.96	6, 10, 6	1.30	
13.52	1, 2, 1	(2.43)		66.64	10, 10, 8	(1.37)	Prob. <i>sr o</i> by 6.87
13.15	3, 5, 2	1.43		63.20	2, 4, 1	1.27	
05.64	2, 5, 2	1.21		61.79	3, 8, 3	1.24	
04.75	5, 8, 5	1.38		60.54	3, 5, 3	(1.19)	
03.41	5, 8, 3	1.64		60.30	5, 2, 1+	(1.31)	
02.81	15, 25, 15	1.54		58.74	6, 12, 5	.69	
02.16	3, 7, 3	1.51		55.69	2, 4, 2	1.20	
01.78	1, 5, 3	(1.09)	<i>sr</i> diffuse	54.76	3, 6, 1	(.78)	
3398.70	4, 8, 3	1.27		54.35	8, 12, 10	1.13	
98.02	1+, 5, 3	(1.25)	<i>sb o</i>	54.10	10, 3, 1+	(1.07)	
97.65	5, 8, 3	(1.42)	<i>sr o</i>	51.38	15, 30, 15	1.38	
96.87	2, 8, 6	1.45	<i>sb o</i>	46.68	4, 6, 4	1.83	
96.62	6, 8, 3	1.39	<i>sr o</i>	45.01	3, 6, 3	1.10	
94.96	6, 7, 4	1.27	Prob. <i>sr o</i> by 5.26	43.77	6, 8, 4	1.25	
94.27	2, 4, 2	1.14		38.54	2, 6, 1	.61	
93.38	2, 4, 2	-(1.10)	<i>sb o</i>	33.22	1+, 3, 1	1.46	
93.13	3, 1+	+(1.07)	<i>sr o</i>	32.56	1, 3, 1+	1.55	
92.20	20, 30, 20	1.54		30.62	3, 7, -3	1.60	
90.54	2, 3, 1+	1.40		28.40	1-, 1, 1-	(1.06)	
88.75	2, 3, 3	1.50		27.32	2, 5, 2	1.41	
85.66	10, 15, 10	.96		26.58	1, 3, 1	(.98)	
83.27	5, 10, 4	1.58		25.27	15, 25, 15	1.58	
81.03	1-, 2, 1	(1.37)		21.57	8, 15, 8	1.32	See 38.00 6comps.

TABLE XVII—CONTINUED

λ	i	$\Delta\lambda/\lambda^2$	REMARKS	λ	i	$\Delta\lambda/\lambda^2$	REMARKS
3320.46	5, 8, 4	(1.08)		3265.73	1—, 3, 1	(1.23)	
17.90	1, .., 2	1.31		64.60	1, 4, 1	(1.45)	
14.99	5, 10, 4	1.78		59.76	1+, 5, 1+	(.97)	
13.82	2, 6, 2	1.49		56.38	8, 12, 8	1.33	
10.35	5, 7, 2	1.29	<i>sr o</i> by 10.65	55.02	2, 7, 2	1.08	
09.25	1+, 4, 1+	1.45		54.95	1+, 4, 1+	(.91)	
04.33	4, 8, 4	1.64		52.85	2, 3, 1	(1.25)	<i>sr o</i>
01.81	2, 4, ..	-(1.48)	<i>sr</i> in shadow of 1.44	52.02	1, 3, 1—	(1.22)	
01.44	6, 8, 5	1.25		49.02	2, 2, 2	1.53	
00.63	.., 3, 1	+(1.00)	<i>sr o</i>	41.25	.., 7, 3	+(1.61)	
3299.80	1, 2, 1	(.99)		39.38	1, 3, 1—	(1.18)	
97.95	5, 10, 4	1.31		38.23	8, 12, 8	(1.16)	
97.47	1+, 4, 1+	1.25		35.95	6, 8, 6	1.68	
96.72	4, 8, 2	1.27		33.70	1—, 1—, 1—	(1.63)	
95.12	.., 6, 2	+(.64)		32.16	3, 2, 2	1.46	
94.37	2, 4, 7	1.63	<i>sb o</i>	30.98	3, 5, 2	1.04	
94.06	7, 8, 5	(1.63)	<i>sr o</i> and <i>sb</i> in shadow of 3.71	29.10	3, 15, 8	.87	
93.71	.., 5, 2	+(1.33)		27.90	1, 3, 1—	1.46	<i>sb o</i>
92.62	10, 20, 8	1.11		26.52	1, 2, 3	(2.19)	<i>sr o</i>
91.88	12, 30, 15	1.81		26.23	3, 2, 1	(1.21)	
90.73	3, 4, 2	1.07		25.80	1, 2, 1	(1.37)	
88.27	2, 2, 1	1.48		21.40	6, 12, 8	1.31	
87.90	7, 12, 7	1.36		20.46	1+, 3, 1+	1.41	
83.11	2, 5, 1+	1.15		17.89	1, 2, 3	(1.79)	<i>sb o</i>
82.75	1+, 4, 2	1.15		17.61	3, 4, 2	(1.02)	<i>sr o</i>
80.52	2, 5, 1+	1.06		16.67	1, 3, 1	(1.49)	
75.20	6, .., 5	1.83	<i>p</i> -is <i>o</i> .	10.43	3, .., 3	1.15	These three lines have diffuse <i>p</i> -components
69.60	1, 4, 1	(1.61)		08.15	2, .., 2	1.44	

TABLE XVIII

λ 4107.58		λ 4112.95		λ 4110.72	
<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$	<i>i</i>	$\Delta\lambda/\lambda^2$
2.....	-(1.16) <i>s</i>	1.....	-(1.15) <i>s</i>	2.....	-1.24 <i>s</i>
4.....	-(.12) <i>p</i>	3.....	+(.13) <i>p</i>	8.....	+ .27 <i>p</i>
2.....	+(1.16) <i>s</i>	1.....	+(1.15) <i>s</i>	3.....	+1.87 <i>s</i>

λ 3294.76	
<i>i</i>	$\Delta\lambda/\lambda^2$
1+.....	-(.77) <i>p</i>
2.....	0.00 <i>s</i>
2.....	+(.77) <i>p</i>

TABLE XIX

λ	INTENSITIES			$\Delta\lambda/\lambda^2$		REMARKS
	No-f	s-	p-	s-	p-	
3875.85	2	1, 4		-2.10	.....	Probably <i>sr o</i> , then unsym.
75.56	2	3, 2		1.26	.....
75.00	8	2, 8	20	1.37	.....	Quadruplet unsymmetrical <i>sr o</i> symmetrical
74.35	3	1, 5-	6	1.35	.....
73.94	10	4, 3	15	.....	.....	Quadruplet unsymmetrical <i>sr o</i> symmetrical
73.56	3	2, 1	5, 1	.....	.....
72.87	10	10, 12	20	.....	.....	Quadruplet unsymmetrical
72.51	..	3	1	.....	.....
..	..	..	5	.....	.....	Quadruplet unsymmetrical
70.30	1	6	4	.....	.....
70.13	2	3	3	.....	.....	Quadruplet unsymmetrical
69.85	1	5.	7	.....	.....
69.54	2	5	5	.....	.....	Quadruplet unsymmetrical
68.23	1	3	2	.....	.....
68.13	3	..	2	.....	.....	Quadruplet unsymmetrical
68.04	2	3	3	.....	.....
67.77	2	3	3	.....	.....	Quadruplet unsymmetrical
67.42	1	1	3, 1+	.....	.....
67.02	8	6, 5	7	.....	.....	Quadruplet unsymmetrical
66.63	1-	2	2	.....	.....
66.21	4	7, 3	3, 6	.....	.....	Quadruplet unsymmetrical
65.72	1	2	2	.....	.....
65.54	..	1	2	.....	.....	Quadruplet unsymmetrical
65.33	1	4	..	.....	.....
65.14	1	..	..	.....	.....	Quadruplet unsymmetrical
65.00	..	1	1-	.....	.....
64.67	1	8	6	.....	.....

λ	INTENSITIES			$\Delta\lambda/\lambda^2$			REMARKS
	No-f	s-	ρ -	s-	ρ -	ρ -	
3864.47	2	3	3	0	0	0	ρ , broad Probably <i>sr o</i>
64.27	1	3	2	0	0	0	
63.54	15	15, 10	10, 20	0	0	0	
62.52	6	7, 3	15	— .93	— .13	0	
61.86	1	5	4	± .75	0	0	
61.69	5	5	4	0	0	0	
61.28	1	1	12	0	0	0	
60.96	1	1+	2	0	0	0	
60.76	2	5	7	0	0	0	
59.98	25	5	..	0	0	0	
59.43	1	2	3	0	0	0	
59.03	2	2	2	0	0	0	
58.30	..	1	1	0	0	0	
57.98	1	2	2	0	0	0	
57.77	1	2	2	0	0	0	
57.57	1	1-	2	0	0	0	
57.47	1	..	..	0	0	0
57.37	..	..	..	0	0	0
57.21	1	4	3	0	0	0	
57.02	1	1	1-	0	0	0	
56.77	3	5	5	0	0	0	
56.45	4	5	2	0	0	0	
56.23	1	..	..	0	0	0
55.90	1	3	2	0	0	0	
55.73	1	5	6	0	0	0	
55.47	..	1	1	0	0	0	
55.13	..	..	1	0	0	0
54.97	3	2	8	0	0	0	

Quadruplet symmetrical

No-f, ρ and s look double

TABLE XIX—CONTINUED

λ	INTENSITIES			$\Delta N/\lambda^2$			REMARKS
	No-f	s-	p-	s-	$p-$		
					
3854.61	25	15, 12	15	-1.08	.....	.....	.....
54.21	1-	1	1+	.....	.....	.....	.....
53.95	1	1	1	.....	.....	.....	.....
53.60	2	5	6	.....	.....	.....	.....
53.07	3	2	5	.....	.....	.....	.....
52.88	1-	..	2	.....	.....	.....	.....
52.59	2	5	7	.....	.....	.....	.....
52.27	4	1	3	.....	.....	.....	.....
52.00	1-	1-	1-	.....	.....	.....	.....
51.72	1+	3	3	.....	.....	.....	.....
51.36	2	2	4	.....	.....	.....	.....
51.24	2	1	..	.....	.....	.....	.....
51.09	1	2	..	.....	.....	.....	.....
50.93	2	2	..	.....	.....	.....	.....
50.74	1	1-	..	.....	.....	.....	.....
50.56	1	1	..	.....	.....	.....	.....
50.39	1	1	3	.....	.....	.....	.....
50.23	5	3	10	.....	.....	.....	.....
50.06	1	3	2	.....	.....	.....	.....
49.83	1	2	2	.....	.....	.....	.....
49.43	1	5	3	.....	.....	.....	.....
49.07	2	8	12	.....	.....	.....	.....
48.93	1-	1	3	.....	.....	.....	.....
48.73	1	1	1, 1	.....	.....	.....	.....
48.34	1-	2	2	.....	.....	.....	.....
48.02	2	6	6	.....	.....	.....	.....
47.43	..	2	2	.....	.....	.....	.....

p- is doublet

TABLE XIX—CONTINUED

λ	INTENSITIES			$A\lambda/\lambda^2$			REMARKS
	No-f	s-	p-	s-	p-	p-	
3847.16	..	..	..	....	....	....	Not on no-f; mixed with 7.02; latter unsymmetrical
47.02	..	6	8	....	....	....
46.40	2	6	8	± 1.20	....	....	0
46.16	1	..	8	....	....	....
45.68	3	8	8	0	....	....	0
45.16	2	6	6	0	....	....
44.81	..	1	1	0	....	....	0
44.37	3	8	7	0	....	....
44.18	1	2	2	0	....	....	0
43.57	2	2	3	0	....	....
43.09	6	8	12	— .19	....	.... + .19	Quadruplet unsymmetrical 5 components symmetrical
42.69	..	..	..	....	....	....
42.10	..	..	..	....	....	....	0
41.87	1	..	3	....	....	....
41.14	1	1—	4	0	....	....	0
40.99	3	6	1	....	....	....
40.61	3	6	7	0	....	....	0
39.90	15	15	30	± 1.38	....	....
39.56	2	?	3	± 1.60	....	....	Triplet symmetrical Triplet symmetrical
39.33	2	7	5	0	....	....
38.87	1	..	2,2	....	....	.... + .24	Exner's line is 8.92, agreeing with <i>pr</i>
38.49	1	2	2	0	— .39	0	
38.01	?	..	..	....	....	....	Quadruplet unsymmetrical
37.76	1	3	2	0	....	....
37.50	1	1	2	0	....	....	0
36.65	10	3, 10	15	— 1.30	.... + .66	....
36.19	1	2	1	0	....	....	0

TABLE XIX—CONTINUED

λ	INTENSITIES			$\Delta\lambda/N^2$		REMARKS
	No-f	s-	p-	s-	p-	
3836.08	1-	1	1-	0	0	...
35.83	1	2	1	0	0	...
35.45	3	3	3	0	0	...
35.21	5	5	5+	0	0	...
34.60	1-	2	1+	0	0	+.48
34.27	2	2	4	0	0	...
33.83	2	6	4	0	0	...
33.10	3	..	6	...	0	...
32.87	..	..	..	...	0	...
32.59	2	4	5	0	0	...
31.90	10	8, 5	20	.86	0	...
31.12	2	1-	3, ..	0	0	1.62
30.93	5	5	7	± 1.64	0	-.63
30.70	..	..	..	...	0	...
30.27	3	1-	2	0	0	...
30.05	1	..	1-	...	0	...
29.81	1+	..	3	..	0	...
29.61	4	5	7	.27	0	...
28.58	5	..	..	...	0	...
28.30	1	..	..	...	0	...
27.92	1-	1	1-	0	0	...
27.69	..	..	2	...	0	...
27.46	..	..	2	...	0	...
27.07	..	..	..	...	0	...
26.86	1+	5	3	0	0	...
26.44	3	.., 4	.., 2	...	0	1.60
26.10	2	..	2	...	0	...
25.87	1	4	2	0	0	...

TABLE XIX—CONTINUED

λ	INTENSITIES		$\Delta\lambda/\lambda^2$		REMARKS
	No-f	<i>s</i> -	<i>p</i> -	<i>p</i> -	
3825.44	1	..		0	....
35.33	2	2, 1	2	0	....
25.25	3	2+, 2	3	0	....
24.96	1-	..	2	0	....
24.70	1-	..	2	0	....
24.52	1	5	2	0	....
24.26	1	1	1	0	....
23.99	1	2	4	0	....
23.76	3	.., 4	8	0	....
23.47	1	..	4	0	....
23.22	3	5	1	0	....
23.06	2	1	3	0	....
22.46	1	..	6	0	....
22.33	..	..	..	0	....
21.92	2	4	3	0	....
21.57	..	..	..	0	....
20.92	4	4	6	0	....
20.54	2	2	6	0	....
20.09	2	1-, 2	3	0	....
19.44	2	2, 6	0	0	.... +.22
19.25	1	1-, 3	3	0	....
18.81	2	1+	2	0	....
18.33	1	1+	2	0	....
17.82	1	8	5	0	....
17.64	3	1-	2	0	....
17.51	2	8, 1, 1, 4	8	0	....

sr o, therefore unsymmetrical

5 components unsymmetrical
p-possibly doublet
Quadruplet symmetrical

sr sharp, *sb dr* broad, *p*-diffuse

p-*db* no-f broad, diffuse

sb at distance 2.05 which makes *sr* coincide with 7.82; for inner pair-*sr* falls on 7.64

TABLE XIX—CONTINUED

λ	INTENSITIES			$\Delta\lambda/\lambda^2$		REMARKS
	No-f	s-	ρ -	s-	ρ -	
3817.25	1	3	..	0	0	Not present on no-f and s- and ρ - not present for next line. Are these then all one line?
17.12	..	1	1	0	0	
16.96	1	..	..	0	0
16.70	2	1	4	0	0	Quadruplet unsymmetrical If ρ -components are present they are too weak or overlap 5.95 and then unsymmetrical $s\rho$ falls on 4.99
16.29	3	6	8	0	0	
15.95	..	..	..	0	0
15.68	3	.., 3	.., 2	s probably double, ρ 4.99 and 4.73
15.16	5	2, 5	8	..	0	
14.99	1	5?	3	..	0	
14.87	2	..	7	0	0	Quadruplet unsymmetrical Triplet with null s- Quadruplet unsymmetrical
14.73	1	5	7	0	0	
14.12	2	..	..	..	..
14.08	2	3	2	0	0	Triplet symmetrical Triplet symmetrical
13.79	4	.., 1	3, 1	..	$\pm .67$	
13.52	1	3, ..	1	..	0	
13.21	20	15	30	..	0	Possibly s- is triplet, as a weak line to ρ is present
12.52	2	1-, 1-	2	± 1.17	0	
12.16	1-	2	2	0	0	
11.79	2	5	5	0	0	No-f line double
11.50	3	4	8	0	0	
11.10	5	1	5	0	0	
10.83	1	3, ..	1	No-f line double
10.70	2	2	3	0	0	
10.00	8	5, 8	20	..	..

TABLE XIX—CONTINUED

λ	INTENSITIES			$\Delta\lambda/\lambda^2$			REMARKS
	No.-f.	s-	\hat{p} -	s-	$\Delta\lambda/\lambda^2$	\hat{p} -	
3809.62	1—	1	1	0	\hat{p} very broad. Probably 2 or 3 comps. A \hat{p} -comp. in position 8.30 s- d' inside, d' outside. \hat{p} - has pos. an external pair of components
09.28	2	3	3	.....	.....	0
08.80	1—	1+	1+	.....	.....	0
08.43	1—	1	1	.....	.....	0
08.04	5	15	8	0	\hat{p} - o \hat{p} r of 6.12, therefore displaced to blue \hat{p} - called a doublet o 6.25 and 5.95
07.38	2	2+	3	.....	.....	0
06.96	2	5	4	.....	.....	0
06.48	7	5	3	.....	.....	0
06.25	1	5	0	Triplet symmetrical Triplet symmetrical Blurred with next line on \hat{p} - plate s- absent and taken as a doublet o 4.34 and 4.01.
06.12	6	5	8,4	.....	.....	0
05.95	2	8	4	.....	.....	0
05.73	5	4	1	.....	.....	0
05.55	3	1, 1—	5	0	Blurred with next line on \hat{p} - plate s- absent and taken as a doublet o 4.34 and 4.01.
05.18	2	1—, 1—	2	.....	.....	0
04.85	3	..	6	.....	.....	0
04.34	1	2	2	.....	.....	0
04.19	2	..	2	0	s- probably unsymmetrical, but no-f line not sharp enough to make the measurement
04.11	1	2	..	.....	.....	0
03.25	8	5, 3	12	0	Quadruplet symmetrical $\hat{p}=s$
03.93	1—	2	1	.....	.....	0
02.65	1	1, 1	1, 1	.....	.....	0
02.31	3	0	

TABLE XIX—CONTINUED

λ	INTENSITIES			$\Delta\lambda/\lambda^2$		REMARKS	
	No-f	s-	p-	s-	p-		
3802.10	2	3	3	0	0	p- is blurred with an adjacent b line. The latter symmetrical with no-f line 1.53	
01.75	2	3	4	0	0		
01.61	3	2, 5	6	-1.28	0		+ .37
01.53	1	..	1	..	0	p- diffuse, possibly doublet. No s- visible. If <i>sr</i> σ 0.80 then <i>sb</i> should be visible	
00.80	3	4, ..	6	1.20	0		
00.53	4	..	5	..	0		
00.37	2	..	..	..	..	Exposure from this line past the next two on p- plate
00.23	1-	3	4	..	0		
3799.79	1	5	2	..	0		- .20
99.65	1-	..	..	..	..	s <i>b</i> is here assumed to σ 7.37
99.36	1	..	1+	..	0		
98.77	1-	3	1-	0	0		
98.66	2	5	2	0	0	If <i>sr</i> σ 7.13, then its sep. = 2.37 approx.	
98.25	3	2	6	1.45	0		
98.12	1-	..	3	..	0		1.82
97.66	3	2, 5	8	1.41	0	If <i>sr</i> σ 7.13, then its sep. = 2.37 approx.	
97.37	2	5	1	..	0		2.25
97.13	1-	4	4	..	0		
96.85	3	.., 1	1+	..	0	1.50	
96.33	1	3	3	..	0	If <i>sr</i> σ 7.13, then its sep. = 2.37 approx.	
95.90	1-	1+	1+	..	0		..
95.53	3	2, 5	5	1.09	0		.74

TABLE XIX—CONTINUED

λ	INTENSITIES			$\Delta\lambda/\lambda^2$			REMARKS
	No-f	s-	\hat{p} -	s-	\hat{p} -	\hat{p} -	
3795.20	1—	1	1	\hat{p} - broad, possibly doub. or triplet Triplet symmetrical s- components <i>o</i> s- components <i>o</i> 7 components symmetrical \hat{p} <i>dr</i> , <i>sr</i> <i>o</i> symmetrical; s- has diffuse background <i>sb</i> <i>o</i> 90.10; \hat{p} - possibly doublet Quadruplet unsymmetrical s- too broad to measure for dissymmetry No-f diffuse, s and \hat{p} - are sharp \hat{p} - diffuse; others sharp No-f broad <i>sb</i> <i>o</i>
94.85	3	1—, 1	1	.....	.....	.....
94.50	2	5	4	.....	.....	.....
94.30	4	4	8	.....	.....	.....
93.95	2	..	3	.....	.....	.....
93.65	2	..	3	.....	.....	.....
93.28	1	1—	1—	.....	.....	.....
93.11	1—	1—	2	.....	.....	.....
92.88	2	.., 2	2	.....	.....	.....
92.52	6	.., 1	..	.....	.....	.....
92.15	2	.., 1	3	.....	.....	.....
91.66	1—	..	..	.....	.....	.....
91.50	5	6, 4	10	.....	.....	.....
90.99	8	6	10	.....	.....	.....
90.67	1—	1—	2	.....	.....	.....
90.51	3	2, 2	2	.....	.....	.....
90.26	2	2, 5	6	.....	.....	.....
90.10	1	5, 1+	.., 2	.....	.....	.....
89.29	15	15, 20	25	.....	.....	.....
88.66	1—	1	2	.....	.....	.....
88.54	3	1+, 1	1	.....	.....	.....
87.80	1—	1	1—	.....	.....	.....
87.65	1	..	2	.....	.....	.....
87.34	2	7	7	.....	.....	.....
87.04	3	1, 2	8	.....	.....	.....
86.12	3	3, ..	8	.....	.....	.....

TABLE XIX—CONTINUED

λ	INTENSITIES			$\Delta\lambda/\lambda^2$		REMARKS
	No-f	s-	p-	s-	p-	
37.85-80	15	..	..	....	....	Quadruplet
85.50	1	1-	1+	....	....	No-f diffuse
84.74	1	3	3	....	0	Region covering this and next two
83.95	1	..	..	....	0	lines all exposed on s-plate
83.83	2	..	5	....	0	
83.68	1-	..	..	....	0	p- broad enough for three lines
83.48	5	..	2	....	0	Quadruplet unsymmetrical
83.15	5	..	..	....	0	
82.35	1	2	1	....	0	
81.83	1-	5	3	....	0	
81.50	2	1+, 1+	1-	....	0	
81.43	3	1+, 2	3	....	+1.77	
80.65	1-	3	3	....	1.58	sb o
79.95	1	5	3	....	0	
78.98	2	6	3	....	0	
78.00	1	3, 1	2, 1	....	0	No-f is sharp; p- and s- are fuzzy
77.60	1	1+	1-	....	0	Quadruplet unsymmetrical
77.27	1	3	1	....	0	
76.80	1-	1	1+	....	0	
76.43	4	2	3	....	0	Triplet symmetrical
76.10	3	..	..	±1.21	0	Quadruplet unsymmetrical
75.47	1	..	..	....	0	Quadruplet unsymmetrical
74.88	2	1-, 1-	12	....	0	Triplet too weak
74.40	5	6	15	....	0	Quadruplet symmetrical
73.94	8	6, 8	3	....	0	Triplet symmetrical
73.23	1	2	1	....	0	
72.83	1+	..	1	....	0	

λ	INTENSITIES			$\Delta\lambda/\lambda^2$			REMARKS
	No-f	s-	p-	s-	p-	p-	
3772.41	3	5, 3	6	-.94	.....	.....	Quadruplet unsymmetrical
71.80	2	..	..	.....	.....	.....	Triplet symmetrical
71.55	8	3	..	± 1.67	.....	.....	Quadruplet unsymmetrical
70.40	1-	..	..	.....	.....	.....
70.25	8	..	..	.....	.....	.....
69.80	2	2, 1+	..	.....	.....	.....
68.62	2	3, 4	5	1.09	.....	.....
68.05	12	6, 8	25	1.20	.....	.....
67.69	1-	..	1	.....	.....	.....
67.39	3	3	6	.....	.....	.....
66.65	1+	1-	1+	.....	.....	.....
65.57	1	6	2, ..	.....	.....	-1.03	
65.43	8	3	12	.....	.....	.....
64.80	1-	..	1	.....	.....	.....
64.48	1-	3	1+	.....	.....	.....
64.26	1	..	1	.....	.....	.....
64.01	1	1	1	.81	.....	.....
63.75	1+	1, 1-	3	1.22	.....	.....
63.49	3	3	3	.98	.....	.....
63.04	15	15	20	.....	.....	.....
62.50	1-	2	2	.....	.....	.....
62.05	1-	..	1-	.....	.....	.....
61.91	1	..	..	.....	.....	.....
61.69	4	1-	3	.....	.....	.....
61.50	1	4	2	.....	.....	.....

TABLE XIX CONTINUED

λ	INTENSITIES			$\Delta\lambda/\lambda^2$		REMARKS
	No-f	s-	p-	s-	p-	
3761.28	4	4, 6	10	.....	.....	sb may belong to another line p- diffuse
60.48	2	2, 1-	5	.....	.....
59.01	2	3	2	.....	.....	Symmetrical triplet Symmetrical triplet o 8.64
59.46	5	3, 5	5	.....	.....
58.64	3	2	3	.....	.....	Symmetrical triplet
58.39	2	1	3	.....	.....
57.88	6	3	8	.....	.....	Symmetrical triplet
57.47	1	.....	1	.....	.....
56.93	1-	.....	1	.....	.....	Symmetrical triplet Symmetrical triplet
56.36	3	1+	5	.....	.....
56.17	2	.....	1	.....	.....	Possibly these s- components do not belong to this line
55.37	3	3	6	.....	.....
54.73	5	5, 3	10	.....	.....	p- diffuse. Symmetrical triplet. p- broad but not resolved in second order
54.17	4	2, 1-	2	.....	.....
53.42	2	1+	2	.....	.....	s- diffuse. No-f broad Quadruplet symmetrical
52.73	20	20	40	.....	.....
51.91	1	1, 1, ..	2	.....	.....	p- diffuse. No-f broad Quadruplet symmetrical
51.22	2	1	2	.....	.....
50.82	1-	1	3	.....	.....	p- diffuse. No-f broad Quadruplet symmetrical
50.65	2	1	1	.....	.....
50.30	..	1	1	.....	.....	p- diffuse. No-f broad Quadruplet symmetrical
49.78	1-	1	1-	.....	.....
49.05	3	.., 1	3	.....	.....	p- diffuse. No-f broad Quadruplet symmetrical
49.26	2	.....	.....	.....	.....
49.12	1	.., 1	..	.....	.....	p- diffuse. No-f broad Quadruplet symmetrical
48.45	5	2, 1	10	.....	.....

λ	INTENSITIES			$\Delta\lambda/\lambda^2$			REMARKS
	No-f	s-	p-	s-	p-	p-	
3747.73	10	Quadruplet symmetrical Quadruplet symmetrical Triplet symmetrical No-f and p- have a b companion inten.=1-
46.64	2	..	..	....	....	....
46.15	12	15	30	....	....	....
45.84	5	.., 2	5	....	....	....
45.38	2	..	1-	....	....	....
45.11	1	2	1-	On s- plate exposed between comps., and sr is o of 5.11 No-f and p- dr
44.89	4	2, 5	10	-1.76	....	....
44.05	1	2	2	....	....	....
43.71	3	2	6	±1.12	....	....
43.15	6	3	8	1.38	....	....
42.45	1	1	2	0	Quadruplet symmetrical sr in shadow of 1.40
41.40	25	..	..	....	....	....
41.02	5	.., 4	8	....	....	....
40.60	1	.., 1	1	....	....	....
39.95	1-	1	1	0	....	....
39.02	10	8, 5	15	1.04	s- is probably unsymmetrical, but no-f is not sharp enough on the edges to fix accurately the null position
38.62	1-	..	1-	....	....	....
37.68	4	2	6	1.56	....	....
37.37	3	2	4	1.11	....	....
37.15	2	1+	3	1.13	....	....
35.70	1	1	3	sb o sr o
35.05	4	2	6	1.56	....	....
34.77	4	3	6	.87	....	....

TABLE XIX—CONTINUED

λ	INTENSITIES			$\Delta N/\lambda^2$		REMARKS
	No-f	s-	p-	s-	t-	
3733.85	2	1, 1	2	.....	0	s- broad diff. Probably sym.
33.51	1	..	1	.....	0	Triplet symmetrical
32.76	2	1, 1	1	.....	0	Triplet symmetrical; sb o
32.47	1	1, 3	1-	.....	0	Quadruplet symmetrical
32.38	1	3	1+	.....	0	Quadruplet symmetrical
31.60	3	..	..	.....	.....	Quadruplet symmetrical
31.03	1-	1	1	.....	0	Quadruplet symmetrical
30.92	8	..	..	.....	0	sr lost in shadow of 0.92
30.61	6	.., 2	5	..... + .72	.....	Quadruplet symmetrical
30.13	1+	..	..	.....	.....	Quadruplet symmetrical
30.00	1	..	..	.....	.....	Quadruplet symmetrical
28.05	6	..	..	.....	.....	s- o 8.05 and 7.47
27.76	2	..	1+	.....	0	Triplet symmetrical; s- too weak
27.47	3	2	..	.....	.....	Triplet symmetrical
27.35	3	..	3	.....	0	Triplet symmetrical
26.89	10	8, 7	15 ± 1.37	0	Triplet symmetrical
26.32	1-	..	1-	.....	0	Triplet symmetrical
26.02	1-	1-	1-	.....	0	Triplet symmetrical
25.55	3	2	4	.....	0	Triplet symmetrical
24.93	4	3, 5	10	..... 1.83	0	Triplet symmetrical
24.70	1+	1	1	.....	..... + .34	sb probably o by 4.70
23.85	3	2, 5	6	..... -1.50	0	One sr comp. between sr and sb of 4.93.
23.40	2	5	3	..... 0	0	Prob. one sr o sb of 4.93.
22.35	12	10	20	..... 1.40	0	There are one or two diff. sb
22.05	15	..	..	.....	.....	comps. p- is weak and possibly a pr component
						9 components unsymmetrical

λ	INTENSITIES:		$\Delta N/\lambda^2$		REMARKS
	No-f	s-	p-	s-	
37.21.76	1—	..	..	..	..
21.04	1	..	..	..	..
21.55	2	1	2	0	..
20.95	2	1+	3	0	..
20.52	15	15, 12	25	1.57	..
20.18	15	..	1	..	..
19.90	1—	..	1	..	..
19.03	10	..	15	1.22	..
19.27	1	..	1	..	..
18.85	1	1, 1	2	1.84	..
18.36	3	2, 2	6	1.24	..
18.02	5	3	8	..	..
16.98	1—	..	1	..	..
16.72	2	..	2	..	..
16.42	1—	..	1	..	..
16.29	1—	..	..	..	..
16.01	1—	..	1	..	..
15.82	1—	..	..	..	..
14.53	1	..	..	..	..
12.80	5	2	5, 3	..	..
12.04	1	..	3	..	..
11.81	4	..	3, 3*	..	..
11.50	10	6, 4	20	1.56	..
09.82	5	1, 3	1, 5, ?	..	..
08.90	3	3, 2	6	1.16	..
07.00	3	1	2	0	..
07.16	3	2, 1	4	..	..
06.15	..	..	..	..	..

Quadruplet symmetrical
p- broad. Looks 2 or 3 comps.

sr o

sb o
sr o. Quadruplet symmetrical

Quadruplet unsymmetrical:

p- broad, possibly triplet
Unsym. 5 comps.

Quadruplet symmetrical

TABLE XIX—CONCLUDED

λ	INTENSITIES			$\Delta\lambda/\lambda^2$		REMARKS
	No-f	s-	p-	s-	p-	
3698.47	..	..	..	..	..	..
98.30	5	..	..	..	..	..
97.21	..	3, 2	2, 1	..	..	..
90.27	3	1	2, 1	..	..	..
78.16	4	..	..	..	..	..
78.00	1	..	..	..	..	..
77.90	1	2	1	0	0	..
56.31	4	2, 1	6	-.55	+1.13	..

Quadruplet symmetrical
 Quadruplet symmetrical
 Quad. p .75, prob. unsym., s diff.
 Quad. 0.67, also quad. unsym.

Quadruplet unsymmetrical
 Quadruplet unsymmetrical

TABLE XX

	INTENSITIES		REMARKS
	<i>s</i> -	<i>p</i> -	
4673.89	2	3	Adjacent to 6.40 and 6.20
4436.72	10	6	
4412.98	25	50	
4311.90	1+	3	Possibly has an external pair of <i>p</i> -
4184.95	5	7	
83.76	5	5	
80.99	5	4	
76.55	4	3	
75.00	1	1	Preceded by two unsymmetrical triplets 4.94 is a weak <i>s</i> -doublet
55.59	1	2	
55.46	4	5	
52.45	2	3	
46.13	3	3	
3993.23	6	6	<i>s o</i> by 8.35 <i>s o</i> by 9.45
3597.59	2	3	
90.42	4	3	
90.08	2	2	
89.22	5	6	
88.50	8	2	
79.62	10	2	
70.03	3	4	
69.82	3	3	
3545.59	5	6		Probably s=0
45.19	3	4	
44.25	2	3	
3498.77	2	5	
73.59	2	4	
24.09	4	8	
3359.87	1	1	
19.13	1+	3	
10.75	1	1	
3270.97	2	2	
57.27	3	5	
40.62	3	3	
35.00	1	1+	
22.00	1+	2	
3190.83	1+	2	
46.15	4	6	

ADDENDUM

Zeeman (*Science Abstracts*, vol. 12, p. 155) confirms the results of Gmelin (*l. c.*) for Mercury line 5791. Purvis (*Proc. Camb. Phil. Soc.*, vol. XV, part I) records a displacement of several lines in the magnetic field toward the red. I had suspected such a change when watching lines under the microscope while an assistant turned the magnetic field current on and off, but had not followed it up with quantitative measurements. This could scarcely be identical with the results of Jack (*l. c.*). It would seem, rather, to be analogous to a pressure shift of the lines. H. Nagaoka and S. Amino (*Science Abstracts*, vol. 12, p. 155) have studied a few spectral lines with very weak fields. They find some unsymmetrical lines, with the red component stronger and least displaced. These displacements plotted against the magnetic field give a hyperbola. Beyond 5000 Gauss the separation is proportional to the field strength and the intensities of the opposite components are equal, i. e. the lines are then altogether symmetrical. This experiment is a signal confirmation of the Voigt theory. It suggests, too, as stated in previous pages, that the dissymmetries herein recorded are different in character and origin. We have, then, the following irregularities in the "Zeeman Effect": first, a displacement as noted by Purvis; second, the "Voigt Effect" developed from the dispersion equations, noted by H. Nagaoka and S. Amino; third, a variation in displacement proportional to the square of the field strength, first observed by Gmelin; fourth, a displacement proportional to the field strength, observed by the author. Some of these are different multiples of small values; fifth, an irregularity arising from the splitting of one of the symmetrical components, also observed by the author. Ions acting or "linked" together might produce results similar to the third and fourth, as shown by Voigt and Ritz.

II.—*The Transmission of Light through Doubly Refracting Plates with Applications to Elliptic Analyzing Systems*

BY L. B. TUCKERMAN, JR.

The importance of the measurement of elliptically polarized light in the study of electro- and magneto-optic phenomena and the optical properties of various substances, has caused many different methods to be devised for the accurate measurement of ellipticity. Among these, the various halfshade methods offer the advantage of convenience combined with high sensibility. No adequate general discussion of these halfshade methods has, however, as yet been published, and this lack has probably contributed in part to the comparatively small use of halfshade methods by investigators. This paper is an attempt to supply this lack.

In discussing some halfshade systems it is necessary to know the effect of three or more successive doubly refracting plates. The direct calculation of this effect is laborious, and the general theorem given by Mallard is almost as cumbersome. The kinematical analogy due to Poincaré, an analogy whose simplicity and convenience make it invaluable in obtaining qualitative or roughly quantitative results, does not lend itself readily to the analytical discussion here desired. I have obtained a general theorem which combines comparative simplicity with ease of application. The first part of the paper gives the derivation of the general theorem and a discussion of its interpretation. The second part consists of the application of the theorem to various halfshade analyzers. No attempt has been made to discuss, except incidentally, the effects of chromatic dispersion or lack of plane parallelism in the light, although such effects are noticeable and even important in practice.

I wish here to express my indebtedness to Mr. A. Q. Tool for his aid in revising the manuscript and in experimentally verifying many results.

GENERAL THEOREM

I. THE INDUCTIVE THEOREM

First Form. A plane wave of monochromatic, elliptically polarized light propagated away from the observer falls normally upon a series of plane parallel, doubly refracting plates. In each plate the planes of polarization of the ordinary and extraordinary vibrations are chosen as axes of reference, and the positive direction in each such that a positive rotation of 90° turns the + ordinary direction into the + extraordinary direction. Each plate is designated by a subscript (1, 2, . . . , k , $k+1$, . . . , n), and the constants of the light emerging from it, referred to the same axes, by the same subscript. The angle between the

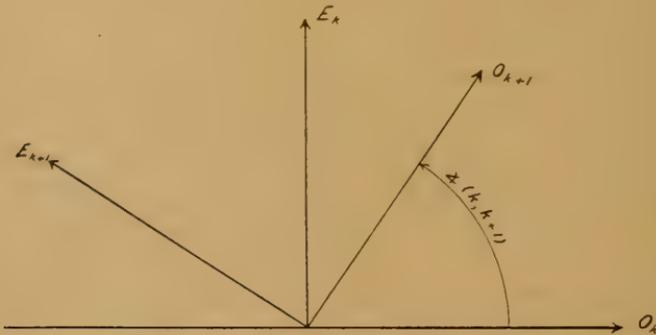


Fig. 1

ordinary axes or principal azimuths of two plates is designated by the subscripts in parentheses, as the angle $(k, k+1)$, and is assumed positive when a positive rotation through the angle $(k, k+1)$ will bring the axes of the first plate into coincidence with those of the second (fig. 1). The light as it emerges from the k th plate is assumed to be defined by the equations:

$$x_k = O_k \cos \omega t$$

$$y_k = E_k \cos(\omega t - \phi_k)$$

where O_k and E_k are the amplitudes of the ordinary and extraordinary vibrations respectively, and ϕ_k , the phase lag of the extraordinary vibration on the ordinary. Referred to the axes of the $(k+1)$ th plate, the equations take the form:

$$x'_{k+1} = O_{k+1} \cos(\omega t - \psi)$$

$$y'_{k+1} = E_{k+1} \cos(\omega t - \chi)$$

where O_{k+1} , E_{k+1} , ψ and χ are functions of O_k , E_k , ϕ_k and the angle $(k, k+1)$. Evaluating them we find:

$$x'_{k+1} = O_k \cos \omega t \cos(k, k+1) + E_k \cos(\omega t - \phi_k) \sin(k, k+1)$$

$$= [O_k \cos(k, k+1) + E_k \cos \phi_k \sin(k, k+1)] \cos \omega t$$

$$+ E_k \sin \phi_k \sin(k, k+1) \sin \omega t$$

$$= O_{k+1} \cos \psi \cos \omega t + O_{k+1} \sin \psi \sin \omega t$$

$$y'_{k+1} = -O_k \cos \omega t \sin(k, k+1) + E_k \cos(\omega t - \phi_k) \cos(k, k+1)$$

$$= [-O_k \sin(k, k+1) + E_k \cos \phi_k \cos(k, k+1)] \cos \omega t$$

$$+ E_k \sin \phi_k \cos(k, k+1) \sin \omega t$$

$$= E_{k+1} \cos \chi \cos \omega t + E_{k+1} \sin \chi \sin \omega t.$$

This gives the values of $O_{k+1} \cos \psi$ and $O_{k+1} \sin \psi$, and of $E_{k+1} \cos \chi$ and $E_{k+1} \sin \chi$. Squaring each and adding corresponding pairs eliminates the phase angles and gives the values of O_{k+1}^2 and E_{k+1}^2 .

$$O_{k+1}^2 = O_k^2 \cos^2(k, k+1) + E_k^2 \sin^2(k, k+1) + O_k E_k \cos \phi_k \sin 2(k, k+1)$$

$$E_{k+1}^2 = O_k^2 \sin^2(k, k+1) + E_k^2 \cos^2(k, k+1) - O_k E_k \cos \phi_k \sin 2(k, k+1).$$

In passing through the plate $(k+1)$ both ordinary and extraordinary vibrations are retarded. The emergent light will be given by:

$$x_{k+1} = O_{k+1} \cos(\omega t - \psi - 2\pi N_{O_{k+1}})$$

$$y_{k+1} = E_{k+1} \cos(\omega t - \chi - 2\pi N_{E_{k+1}})$$

where $N_{O_{k+1}}$ and $N_{E_{k+1}}$ are the orders of the plate for ordinary and extraordinary waves measured in wave-lengths.

$$\begin{aligned} \text{Then: } \phi_{k+1} &= \chi - \psi - 2\pi(N_{O_{k+1}} - N_{E_{k+1}}) \\ &= \chi - \psi - 2\pi N_{k+1} \end{aligned}$$

where N_{k+1} is the differential order of the plate and is positive if the ordinary wave is the slower.

By forming the expression $O_{k+1}E_{k+1} \cos \phi_{k+1}$; expanding in terms of χ and ψ ; substituting the values found above for $O_{k+1} \cos \psi$, $O_{k+1} \sin \psi$, $E_{k+1} \cos \chi$ and $E_{k+1} \sin \chi$; and simplifying the resulting expression, the following equation is obtained:

$$\begin{aligned} O_{k+1}E_{k+1} \cos \phi_{k+1} &= [\frac{1}{2}(E_k^2 - O_k^2) \sin 2(k, k+1) \\ &+ O_k E_k \cos \phi_k \cos 2(k, k+1)] \cos 2\pi N_{k+1} + O_k E_k \sin \phi_k \sin 2\pi N_{k+1}. \end{aligned}$$

Similarly:

$$\begin{aligned} O_{k+1}E_{k+1} \sin \phi_{k+1} &= -[\frac{1}{2}(E_k^2 - O_k^2) \sin 2(k, k+1) \\ &+ O_k E_k \cos \phi_k \cos 2(k, k+1)] \sin 2\pi N_{k+1} + O_k E_k \sin \phi_k \cos 2\pi N_{k+1}. \end{aligned}$$

To simplify the above results the following notation is introduced:

$$\begin{aligned} O^2 &= I & I+J &= 2P & OE \cos \phi &= K \\ E^2 &= J & I-J &= 2Q & OE \sin \phi &= S \end{aligned} \quad (1)$$

Introducing these symbols the equations become:

$$\begin{aligned} I_{k+1} &= I_k \cos^2(k, k+1) + J_k \sin^2(k, k+1) + K_k \sin 2(k, k+1) \\ J_{k+1} &= I_k \sin^2(k, k+1) + J_k \cos^2(k, k+1) - K_k \sin 2(k, k+1) \\ K_{k+1} &= [\frac{1}{2}(J_k - I_k) \sin 2(k, k+1) + K_k \cos 2(k, k+1)] \cos 2\pi N_{k+1} \\ &\quad + S_k \sin 2\pi N_{k+1} \\ S_{k+1} &= -[\frac{1}{2}(J_k - I_k) \sin 2(k, k+1) + K_k \cos 2(k, k+1)] \sin 2\pi N_{k+1} \\ &\quad + S_k \cos 2\pi N_{k+1} \end{aligned}$$

and finally the inductive theorem in its first form:

$$\begin{aligned} P_{k+1} &= +P_k \\ Q_{k+1} &= +Q_k \cos 2(k, k+1) \\ &\quad + K_k \sin 2(k, k+1) \\ K_{k+1} &= -Q_k \sin 2(k, k+1) \cos 2\pi N_{k+1} \\ &\quad + K_k \cos 2(k, k+1) \cos 2\pi N_{k+1} \\ &\quad + S_k \sin 2\pi N_{k+1} \end{aligned} \quad (2)$$

$$\begin{aligned}
 S_{k+1} = & + Q_k \sin 2(k, k+1) \sin 2\pi N_{k+1} \\
 & - K_k \cos 2(k, k+1) \sin 2\pi N_{k+1} \\
 & + S_k \cos 2\pi N_{k+1}
 \end{aligned}
 \tag{2}$$

These four equations form the general inductive theorem for the passage of elliptically polarized light, normally through plane parallel doubly refracting plates. This theorem neglects all losses by reflection at the surfaces of the plates, and by absorption in the plates. These alter the intensity of the light by quantities of the first order, but their differential effects are, in transparent media, all of the second order and hence do not measurably affect the character of the polarization of the light.

Second Form. If the theorem in this first form be applied twice in succession:

$$P_{k+2} = + P_k$$

$$\begin{aligned}
 Q_{k+2} = & + Q_k \left| \begin{array}{l} + \cos 2(k, k+1) \cos 2(k+1, k+2) \\ - \sin 2(k, k+1) \sin 2(k+1, k+2) \cos 2\pi N_{k+1} \end{array} \right| \\
 & + K_k \left| \begin{array}{l} + \sin 2(k, k+1) \cos 2(k+1, k+2) \\ + \cos 2(k, k+1) \sin 2(k+1, k+2) \cos 2\pi N_{k+1} \end{array} \right| \\
 & + S_k \sin 2(k+1, k+2) \sin 2\pi N_{k+1}
 \end{aligned}$$

$$\begin{aligned}
 K_{k+2} = & + Q_k \left| \begin{array}{l} - \cos 2(k, k+1) \sin 2(k+1, k+2) \dots \dots \cos 2\pi N_{k+2} \\ - \sin 2(k, k+1) \cos 2(k+1, k+2) \cos 2\pi N_{k+1} \cos 2\pi N_{k+2} \\ + \sin 2(k, k+1) \dots \dots \sin 2\pi N_{k+1} \sin 2\pi N_{k+2} \end{array} \right| \\
 & + K_k \left| \begin{array}{l} - \sin 2(k, k+1) \sin 2(k+1, k+2) \dots \dots \cos 2\pi N_{k+2} \\ + \cos 2(k, k+1) \cos 2(k+1, k+2) \cos 2\pi N_{k+1} \cos 2\pi N_{k+2} \\ - \cos 2(k, k+1) \dots \dots \sin 2\pi N_{k+1} \sin 2\pi N_{k+2} \end{array} \right| \\
 & + S_k \left| \begin{array}{l} + \cos 2(k+1, k+2) \sin 2\pi N_{k+1} \cos 2\pi N_{k+2} \\ + \dots \dots \cos 2\pi N_{k+1} \sin 2\pi N_{k+2} \end{array} \right|
 \end{aligned}$$

$$\begin{aligned}
 S_{k+2} = & +Q_k \left[\begin{aligned} & +\cos 2(k, k+1) \sin 2(k+1, k+2) \dots \sin 2\pi N_{k+2} \\ & +\sin 2(k, k+1) \cos 2(k+1, k+2) \cos 2\pi N_{k+1} \sin 2\pi N_{k+2} \\ & +\sin 2(k, k+1) \dots \sin 2\pi N_{k-1} \cos 2\pi N_{k-2} \end{aligned} \right] \\
 & +K_k \left[\begin{aligned} & +\sin 2(k, k+1) \sin 2(k+1, k+2) \dots \sin 2\pi N_{k+2} \\ & -\cos 2(k, k+1) \cos 2(k+1, k+2) \cos 2\pi N_{k-1} \sin 2\pi N_{k+2} \\ & -\cos 2(k, k+1) \dots \sin 2\pi N_{k-1} \cos 2\pi N_{k+2} \end{aligned} \right] \\
 & +S_k \left[\begin{aligned} & -\cos 2(k+1, k+2) \sin 2\pi N_{k+1} \sin 2\pi N_{k+2} \\ & + \dots \cos 2\pi N_{k-1} \cos 2\pi N_{k-2} \end{aligned} \right]
 \end{aligned}$$

If in these equations the following substitutions are made:

$$\begin{aligned}
 P_{k+2} = P'_{k+1} & & Q_{k+2} = Q'_{k+1} & & \chi(k+1, k+2) = -\chi(k, k+1) \\
 K_{k+2} = K'_{k+1} & & S_{k+2} = S'_{k+1} & & N_{k+2} = 0
 \end{aligned}$$

they give the change produced by the $(k+1)$ th plate when the emergent light is referred to the same axes as the incident light, instead of, as in the first form, to the axes of the $(k+1)$ th plate. This gives the theorem in its second form:

$$\begin{aligned}
 P'_{k+1} & = +P_k \\
 Q'_{k+1} & = +Q_k [1 - 2\sin^2 2(k, k+1) \sin^2 \pi N_{k+1}] \\
 & \quad +K_k \sin 4(k, k+1) \sin^2 \pi N_{k-1} \\
 & \quad -S_k \sin 2(k, k+1) \sin 2\pi N_{k+1} \\
 K'_{k+1} & = +Q_k \sin 4(k, k+1) \sin^2 \pi N_{k+1} \tag{3} \\
 & \quad +K_k [1 - 2\cos^2 2(k, k+1) \sin^2 \pi N_{k+1}] \\
 & \quad +S_k \cos 2(k, k+1) \sin 2\pi N_{k+1} \\
 S'_{k+1} & = +Q_k \sin 2(k, k+1) \sin 2\pi N_{k+1} \\
 & \quad -K_k \cos 2(k, k+1) \sin 2\pi N_{k+1} \\
 & \quad +S_k \cos 2\pi N_{k-1}
 \end{aligned}$$

This alternative form of the theorem, while not so simple

and therefore not usually so convenient as the first, is useful in discussing the effect of the rotation of a single plate, as in the discussion of errors and in the geometrical analogy of Poincaré's sphere.

2. GENERAL THEOREM

To obtain the effect of n successive plates it is necessary to apply the inductive theorem n times in succession. The transformations of \mathbf{Q} , \mathbf{K} and \mathbf{S} in equations (2) and (3) are linear transformations. A series of linear transformations give a linear transformation as a resultant, the coefficients of the resultant transformation being obtained from those of the series by the theorem for the multiplication of determinants. The following notation is convenient:

$$\begin{aligned} \mathbf{Q}_{k+1} &= (\mathcal{Q}_k, \mathcal{Q}_{k+1}) \mathbf{Q}_k + (K_k, \mathcal{Q}_{k+1}) \mathbf{K}_k + (S_k, \mathcal{Q}_{k+1}) \mathbf{S}_k \\ \mathbf{K}_{k+1} &= (\mathcal{Q}_k, K_{k+1}) \mathbf{Q}_k + (K_k, K_{k+1}) \mathbf{K}_k + (S_k, K_{k+1}) \mathbf{S}_k \\ \mathbf{S}_{k+1} &= (\mathcal{Q}_k, S_{k+1}) \mathbf{Q}_k + (K_k, S_{k+1}) \mathbf{K}_k + (S_k, S_{k+1}) \mathbf{S}_k \end{aligned} \quad (4)$$

$k=0, 1, 2, 3, \dots, (n-1).$

and

$$\begin{aligned} \mathbf{Q}_n &= (\mathcal{Q}_0, \mathcal{Q}_n) \mathbf{Q}_0 + (K_0, \mathcal{Q}_n) \mathbf{K}_0 + (S_0, \mathcal{Q}_n) \mathbf{S}_0 \\ \mathbf{K}_n &= (\mathcal{Q}_0, K_n) \mathbf{Q}_0 + (K_0, K_n) \mathbf{K}_0 + (S_0, K_n) \mathbf{S}_0 \\ \mathbf{S}_n &= (\mathcal{Q}_0, S_n) \mathbf{Q}_0 + (K_0, S_n) \mathbf{K}_0 + (S_0, S_n) \mathbf{S}_0 \end{aligned} \quad (5)$$

where (\mathcal{Q}_k, K_{k+1}) is a symbol representing the coefficient of \mathbf{Q}_k in the expression for \mathbf{K}_{k+1} , (S_0, \mathcal{Q}_n) representing the coefficient of \mathbf{S}_0 in \mathbf{Q}_n , etc.

The effect of n successive plates is then known when the coefficients $(\mathcal{Q}_0, \mathcal{Q}_n)$, (\mathcal{Q}_0, K_n) , etc., are expanded in terms of $(\mathcal{Q}_k, \mathcal{Q}_{k+1})$, (\mathcal{Q}_k, K_{k+1}) , etc., for $k=0, 1, 2, 3, \dots, (n-1)$. The theorem for the multiplication of determinants gives:

$$(a_0, a_n) = \sum_{\alpha_k} \prod_{k=0}^{k=n-1} (a_k, a_{k+1}) \quad (6)$$

where $a_k = Q_k, K_k$, or S_k , and \sum_{α_k} indicates the summation of the results obtained by substituting these values in all possible combinations.

This is the required relation between (Q_o, Q_n) , (Q_o, K_n) , etc., and (Q_k, Q_{k+1}) , (Q_k, K_{k+1}) , etc.

The coefficients (α_k, α_{k+1}) for the two forms of the inductive theorem are:

First Form

$$\begin{aligned}
 (Q_k, Q_{k+1}) &= +\cos 2(k, k+1) \\
 (K_k, K_{k+1}) &= +\cos 2(k, k+1) \cos 2\pi N_{k+1} \\
 (S_k, S_{k+1}) &= +\cos 2\pi N_{k+1} \\
 (K_k, S_{k+1}) &= -\cos 2(k, k+1) \sin 2\pi N_{k+1} \\
 (S_k, K_{k+1}) &= +\sin 2\pi N_{k+1} \\
 (S_k, Q_{k+1}) &= 0 \\
 (Q_k, S_{k+1}) &= +\sin 2(k, k+1) \sin 2\pi N_{k+1} \\
 (Q_k, K_{k+1}) &= -\sin 2(k, k+1) \cos 2\pi N_{k+1} \\
 (K_k, Q_{k+1}) &= +\sin 2(k, k+1)
 \end{aligned} \tag{7}$$

Second Form

$$\begin{aligned}
 (Q_k, Q_{k+1}) &= 1 - 2\sin^2 2(k, k+1) \sin^2 \pi N_{k+1} \\
 (K_k, K_{k+1}) &= 1 - 2\cos^2 2(k, k+1) \sin^2 \pi N_{k+1} \\
 (S_k, S_{k+1}) &= +\cos 2\pi N_{k+1} \\
 (K_k, S_{k+1}) &= -\cos 2(k, k+1) \sin 2\pi N_{k+1} \\
 (S_k, K_{k+1}) &= +\cos 2(k, k+1) \sin 2\pi N_{k+1} \\
 (S_k, Q_{k+1}) &= -\sin 2(k, k+1) \sin 2\pi N_{k+1} \\
 (Q_k, S_{k+1}) &= +\sin 2(k, k+1) \sin 2\pi N_{k+1} \\
 (Q_k, K_{k+1}) &= +\sin 4(k, k+1) \sin^2 \pi N_{k+1} \\
 (K_k, Q_{k+1}) &= +\sin 4(k, k+1) \sin^2 \pi N_{k+1}
 \end{aligned} \tag{8}$$

The equations for the effect of any number of plates can then be written directly in either of the two forms by the use of equation

(6). These equations can be transformed into a form analogous to that given by Mallard,¹ involving functions of the sums and differences of the orders of the plates, but the result is more complicated and less convenient for use.

Inverse Form.—It will be shown later (5, p. 15) that the coefficients (Q_o, Q_n) , (Q_o, K_n) , etc., may be considered as the direction cosines of a rotation of a system of rectangular coordinates. The inverse theorem may therefore be written:

$$\begin{aligned} Q_o &= (Q_o, Q_n) Q_n + (Q_o, K_n) K_n + (Q_o, S_n) S_n \\ K_o &= (K_o, Q_n) Q_n + (K_o, K_n) K_n + (K_o, S_n) S_n \\ S_o &= (S_o, Q_n) Q_n + (S_o, K_n) K_n + (S_o, S_n) S_n \end{aligned} \tag{9}$$

3. SPÉCIAL CASES

The following special cases of the general theorem will be used in the applications following and are here given for convenient reference.

Initial light:

$$P_o, Q_o, K_o, S_o. \tag{10}$$

After passing through one plate:

First Form

$$\begin{aligned} P_1 &= +P_o \\ Q_1 &= +Q_o \cos 2(\theta, \mathbf{I}) \\ &\quad + K_o \sin 2(\theta, \mathbf{I}) \\ K_1 &= -Q_o \sin 2(\theta, \mathbf{I}) \cos 2\pi N_1 \\ &\quad + K_o \cos 2(\theta, \mathbf{I}) \cos 2\pi N_1 \\ &\quad + S_o \dots \dots \sin 2\pi N_1 \\ S_1 &= +Q_o \sin 2(\theta, \mathbf{I}) \sin 2\pi N_1 \\ &\quad - K_o \cos 2(\theta, \mathbf{I}) \sin 2\pi N_1 \\ &\quad - S_o \dots \dots \cos 2\pi N_1 \end{aligned} \tag{11}$$

¹Mallard E. *Traité de Cristallographie*, Paris, 1884, T. 2, pp. 169-74.

Second Form

$$P_1 = -P_0$$

$$\begin{aligned} Q_1 = & +Q_0 [1 - 2 \sin^2 2(\theta, \Gamma) \sin^2 \pi N_1] \\ & +K_0 \sin 4(\theta, \Gamma) \sin \pi N_1 \\ & -S_0 \sin 2(\theta, \Gamma) \sin 2 \pi N_1 \end{aligned}$$

$$\begin{aligned} K_1 = & +Q_0 \sin 4(\theta, \Gamma) \sin^2 \pi N_1 \\ & +K_0 [1 - 2 \cos^2 2(\theta, \Gamma) \sin^2 \pi N_1] \\ & +S_0 \cos 2(\theta, \Gamma) \sin 2 \pi N_1 \end{aligned} \quad (12)$$

$$\begin{aligned} S_1 = & +Q_0 \sin 2(\theta, \Gamma) \sin 2 \pi N_1 \\ & -K_0 \cos 2(\theta, \Gamma) \sin 2 \pi N_1 \\ & +S_0 \dots \dots \cos 2 \pi N_1 \end{aligned}$$

Inverse Second Form

$$P_0 = +P_1$$

$$\begin{aligned} Q_0 = & +Q_1 [1 - 2 \sin^2 2(\theta, \Gamma) \sin^2 \pi N_1] \\ & +K_1 \sin 4(\theta, \Gamma) \sin^2 \pi N_1 \\ & +S_1 \sin 2(\theta, \Gamma) \sin 2 \pi N_1 \end{aligned}$$

$$\begin{aligned} K_0 = & -Q_1 \sin 4(\theta, \Gamma) \sin^2 \pi N_1 \\ & +K_1 [1 - \cos^2 2(\theta, \Gamma) \sin^2 \pi N_1] \\ & -S_1 \cos 2(\theta, \Gamma) \sin 2 \pi N_1 \end{aligned} \quad (13)$$

$$\begin{aligned} S_0 = & -Q_1 \sin 2(\theta, \Gamma) \sin 2 \pi N_1 \\ & +K_1 \cos 2(\theta, \Gamma) \sin 2 \pi N_1 \\ & -S_1 \dots \dots \cos 2 \pi N_1 \end{aligned}$$

After passing through two plates:

First Form

$$P_2 = +P_0$$

$$Q_2 = +Q_0 \left| \begin{array}{l} +\cos 2(0,1) \dots \dots \cos 2(1,2) \\ -\sin 2(0,1) \cos 2\pi N_1 \sin 2(1,2) \end{array} \right|$$

$$+K_0 \left| \begin{array}{l} +\sin 2(0,1) \dots \dots \cos 2(1,2) \\ +\cos 2(0,1) \cos 2\pi N_1 \sin 2(1,2) \end{array} \right|$$

$$+S_0 \dots \dots \sin 2\pi N_1 \sin 2(1,2)$$

$$K_2 = +Q_0 \left| \begin{array}{l} -\cos 2(0,1) \dots \dots \sin 2(1,2) \cos 2\pi N_2 \\ -\sin 2(0,1) \cos 2\pi N_1 \cos 2(1,2) \cos 2\pi N_2 \\ +\sin 2(0,1) \sin 2\pi N_1 \dots \dots \sin 2\pi N_2 \end{array} \right|$$

$$+K_0 \left| \begin{array}{l} -\sin 2(0,1) \dots \dots \sin 2(1,2) \cos 2\pi N_2 \\ +\cos 2(0,1) \cos 2\pi N_1 \cos 2(1,2) \cos 2\pi N_2 \\ -\cos 2(0,1) \sin 2\pi N_1 \dots \dots \sin 2\pi N_2 \end{array} \right| \tag{14}$$

$$+S_0 \left| \begin{array}{l} + \dots \dots \sin 2\pi N_1 \cos 2(1,2) \cos 2\pi N_2 \\ + \dots \dots \cos 2\pi N_1 \dots \dots \sin 2\pi N_2 \end{array} \right|$$

$$S_2 = +Q_0 \left| \begin{array}{l} +\cos 2(0,1) \dots \dots \sin 2(1,2) \sin 2\pi N_2 \\ +\sin 2(0,1) \cos 2\pi N_1 \cos 2(1,2) \sin 2\pi N_2 \\ +\sin 2(0,1) \sin 2\pi N_1 \dots \dots \cos 2\pi N_2 \end{array} \right|$$

$$+K_0 \left| \begin{array}{l} +\sin 2(0,1) \dots \dots \sin 2(1,2) \sin 2\pi N_2 \\ -\cos 2(0,1) \cos 2\pi N_1 \cos 2(1,2) \sin 2\pi N_2 \\ -\cos 2(0,1) \sin 2\pi N_1 \dots \dots \cos 2\pi N_2 \end{array} \right|$$

$$+S_0 \left| \begin{array}{l} - \dots \dots \sin 2\pi N_1 \cos 2(1,2) \sin 2\pi N_2 \\ + \dots \dots \cos 2\pi N_1 \dots \dots \cos 2\pi N_2 \end{array} \right|$$

After passing through three plates :

First Form

$$\begin{aligned}
 Q_3 = + Q_o & \left| \begin{array}{l} + \cos 2(0, 1) \dots \dots \cos 2(1, 2) \dots \dots \cos 2(2, 3) \\ - \cos 2(0, 1) \dots \dots \sin 2(1, 2) \cos 2\pi N_2 \sin 2(2, 3) \\ - \sin 2(0, 1) \cos 2\pi N_1 \sin 2(1, 2) \dots \dots \cos 2(2, 3) \\ - \sin 2(0, 1) \cos 2\pi N_1 \cos 2(1, 2) \cos 2\pi N_2 \sin 2(2, 3) \\ + \sin 2(0, 1) \sin 2\pi N_1 \dots \dots \sin 2\pi N_2 \sin 2(2, 3) \end{array} \right. \\
 + K_o & \left| \begin{array}{l} - \sin 2(0, 1) \dots \dots \cos 2(1, 2) \dots \dots \cos 2(2, 3) \\ - \sin 2(0, 1) \dots \dots \sin 2(1, 2) \cos 2\pi N_2 \sin 2(2, 3) \\ + \cos 2(0, 1) \cos 2\pi N_1 \sin 2(1, 2) \dots \dots \cos 2(2, 3) \\ + \cos 2(0, 1) \cos 2\pi N_1 \cos 2(1, 2) \cos 2\pi N_2 \sin 2(2, 3) \\ - \cos 2(0, 1) \sin 2\pi N_1 \dots \dots \sin 2\pi N_2 \sin 2(2, 3) \end{array} \right. \quad (15) \\
 + S_o & \left| \begin{array}{l} + \dots \dots \sin 2\pi N_1 \sin 2(1, 2) \dots \dots \cos 2(2, 3) \\ + \dots \dots \sin 2\pi N_1 \cos 2(1, 2) \cos 2\pi N_2 \sin 2(2, 3) \\ + \dots \dots \cos 2\pi N_1 \dots \dots \sin 2\pi N_2 \sin 2(2, 3) \end{array} \right.
 \end{aligned}$$

4. INTERPRETATION OF RESULTS

If the major and minor axes of the original ellipse are taken as axes of reference, the following relations are obtained :

$$\begin{aligned}
 P_o &= \frac{1}{2}(O_o^2 + E_o^2) = \frac{1}{2}I_o(1 + e^2) \\
 Q_o &= \frac{1}{2}(O_o^2 - E_o^2) = \frac{1}{2}I_o(1 - e^2) = P_o \frac{1 - e^2}{1 + e^2} \\
 K_o &= O_o E_o \cos \phi_o = O_o E_o \cos \frac{\pi}{2} = 0 \\
 S_o &= O_o E_o \sin \phi_o = I_o e_o \sin \frac{\pi}{2} = P_o \frac{2e_o}{1 + e^2}
 \end{aligned} \quad (16)$$

where e , the ellipticity of the light, is the ratio $\frac{E}{O}$. The values of P , Q , K and S referred to any axes may be obtained by giving N_1

in equation (11) the value α and finding P_1 , Q_1 , K_1 and S_1 . Letting the $\angle(\alpha, \beta) = -\theta_0$, this gives:

$$\begin{aligned}
 P_1 &= P_0 \\
 Q_1 &= Q_0 \cos 2(\alpha, \beta) = P_0 \frac{1 - e_0^2}{1 + e_0^2} \cos 2\theta_0 \\
 K_1 &= -Q_0 \sin 2(\alpha, \beta) = P_0 \frac{1 - e_0^2}{1 + e_0^2} \sin 2\theta_0 \\
 S_1 &= S_0 = P_0 \frac{2e_0}{1 + e_0^2}
 \end{aligned}
 \tag{17}$$

P and S are therefore invariant for any rotation of the axes.

When the direction of propagation and the plane of the ordinary vibration are given, P , Q , K and S completely define the properties of any completely polarized light. In fact, only three of them are necessary since there exists between them the equation:

$$Q^2 + K^2 + S^2 = P^2 \tag{18}$$

From equations (17) any of the ordinary constants of the light may easily be obtained. The following are the more important ones:

The ordinary and extraordinary intensities, I and J :

$$I = P + Q \quad J = P - Q \tag{19}$$

The phase lag of the extraordinary on the ordinary vibration:

$$\phi = \arctg \frac{S}{K} \tag{20}$$

The intensities of the light in the major and minor axes of the ellipse, I_m and J_m :

$$\begin{aligned}
 I_m &= P + \sqrt{P^2 - S^2} \\
 J_m &= P - \sqrt{P^2 - S^2}
 \end{aligned}
 \tag{21}$$

The angle θ which the major axis of the ellipse makes with the plane of the ordinary vibration:

$$\theta = \frac{1}{2} \arctg \frac{K}{Q} \tag{22}$$

The total intensity of the light $=2P$;

The ellipticity e , the ratio of the minor and major axes of the ellipse. The ellipticity is considered positive when the light vector rotates counter clockwise, as we look in the direction of propagation of the light,

$$e = \frac{P - \sqrt{P^2 - S^2}}{S} \quad (23)$$

The positive sign of the square root is always taken so that $-1 < e < +1$.

The following inverse relations are also useful:

$$\begin{aligned} 2P &= I + J = I_m + J_m \\ 2Q &= I - J = (I_m - J_m) \cos 2\theta = 2P \frac{1 - e^2}{1 + e^2} \cos 2\theta \\ 2K &= 2\sqrt{IJ} \cos \phi = (I_m - J_m) \sin 2\theta = 2P \frac{1 - e^2}{1 + e^2} \sin 2\theta \\ S &= \sqrt{IJ} \sin \phi = \sqrt{I_m J_m} = P \frac{2e}{1 + e^2} \end{aligned} \quad (24)$$

It is often convenient to express the ellipticity in terms of an auxiliary angle, ω , defined by the equation, $\text{tg } \omega = e$. Then

$$\frac{1 - e^2}{1 + e^2} = \cos 2\omega, \quad \frac{2e}{1 + e^2} = \sin 2\omega \quad \text{and} \quad \frac{2e}{1 - e^2} = \text{tg } 2\omega$$

from which:

$$\begin{aligned} Q &= P \cos 2\omega \cos 2\theta \\ K &= P \cos 2\omega \sin 2\theta \\ S &= P \sin 2\omega \end{aligned} \quad (25)$$

5. THE POINCARÉ SPHERE

The equation:

$$Q^2 + K^2 + S^2 = P^2 \quad (18)$$

suggests a geometric representation of the quantities involved. Letting Q , K and S represent the distances of a point from the

origin along three right-handed rectangular axes, then the locus $P = \text{constant}$, is a sphere. Poincaré¹ has pointed out a beautiful analogy between the action of a doubly refracting plate and the rotation of a sphere. Examination shows that the sphere defined above is the Poincaré Sphere.

The general linear transformation:

$$\begin{aligned} Q_{k+1} &= (Q_k, Q_{k+1}) Q_k + (K_k, Q_{k+1}) K_k + (S_k, Q_{k+1}) S_k \\ K_{k+1} &= (Q_k, K_{k+1}) Q_k + (K_k, K_{k+1}) K_k + (S_k, K_{k+1}) S_k \\ S_{k+1} &= (Q_k, S_{k+1}) Q_k + (K_k, S_{k+1}) K_k + (S_k, S_{k+1}) S_k \end{aligned} \quad (4)$$

represents the rotation of a solid body, provided:

$$\begin{aligned} (Q_k, Q_{k+1})^2 + (K_k, Q_{k+1})^2 + (S_k, Q_{k+1})^2 &= 1 \\ (Q_k, K_{k+1})^2 + (K_k, K_{k+1})^2 + (S_k, K_{k+1})^2 &= 1 \\ (Q_k, S_{k+1})^2 + (K_k, S_{k+1})^2 + (S_k, S_{k+1})^2 &= 1 \end{aligned} \quad (26)$$

$$\begin{aligned} (Q_k, K_{k+1})(Q_k, S_{k+1}) + (K_k, K_{k+1})(K_k, S_{k+1}) + (S_k, K_{k+1})(S_k, S_{k+1}) &= 0 \\ (Q_k, S_{k+1})(Q_k, Q_{k+1}) + (K_k, S_{k+1})(K_k, Q_{k+1}) + (S_k, S_{k+1})(S_k, Q_{k+1}) &= 0 \\ (Q_k, Q_{k+1})(Q_k, K_{k+1}) + (K_k, Q_{k+1})(K_k, K_{k+1}) + (S_k, Q_{k+1})(S_k, K_{k+1}) &= 0 \end{aligned} \quad (27)$$

and

$$\begin{vmatrix} (Q_k, Q_{k+1}), & (K_k, Q_{k+1}), & (S_k, Q_{k+1}) \\ (Q_k, K_{k+1}), & (K_k, K_{k+1}), & (S_k, K_{k+1}) \\ (Q_k, S_{k+1}), & (K_k, S_{k+1}), & (S_k, S_{k+1}) \end{vmatrix} = +1 \quad (28)$$

These equations are satisfied by both forms of the inductive and general theorems given above. The coefficients of a linear transformation satisfying the above conditions may be written:

$$\begin{aligned} (Q_k, Q_{k+1}) &= 1 - 2 \sin^2 a \sin^2 \frac{1}{2} r \\ (K_k, K_{k+1}) &= 1 - 2 \sin^2 b \sin^2 \frac{1}{2} r \\ (S_k, S_{k+1}) &= 1 - 2 \sin^2 c \sin^2 \frac{1}{2} r \end{aligned} \quad (29)$$

¹Poincaré H. *Théorie Mathématique de la Lumière*, Paris, 1892, T. 2, pp. 275-85.

$$\begin{aligned}
 (K_k, S_{k+1}) &= 2 \cos b \cos c \sin^2 \frac{1}{2} r - \cos a \sin r \\
 (S_k, K_{k+1}) &= 2 \cos b \cos c \sin^2 \frac{1}{2} r + \cos a \sin r \\
 (S_k, Q_{k+1}) &= 2 \cos c \cos a \sin^2 \frac{1}{2} r - \cos b \sin r \\
 (Q_k, S_{k+1}) &= 2 \cos c \cos a \sin^2 \frac{1}{2} r + \cos b \sin r \\
 (Q_k, K_{k+1}) &= 2 \cos a \cos b \sin^2 \frac{1}{2} r - \cos c \sin r \\
 (K_k, Q_{k+1}) &= 2 \cos a \cos b \sin^2 \frac{1}{2} r + \cos c \sin r
 \end{aligned} \tag{29}$$

Where $\cos a$, $\cos b$ and $\cos c$ are the direction cosines of the axis of rotation, and r , the angle of rotation.

From these,

$$\begin{aligned}
 \sin r &= \frac{1}{2} \sqrt{4 - [(Q_k, Q_{k+1}) + (K_k, K_{k+1}) + (S_k, S_{k+1}) - 1]^2} \\
 \cos a &= \frac{1}{2} \frac{(S_k, K_{k-1}) - (K_k, S_{k-1})}{\sin r} \\
 \cos b &= \frac{1}{2} \frac{(Q_k, S_{k-1}) - (S_k, Q_{k-1})}{\sin r} \\
 \cos c &= \frac{1}{2} \frac{(K_k, Q_{k-1}) - (Q_k, K_{k-1})}{\sin r}
 \end{aligned} \tag{30}$$

Substituting in the above the values of the coefficients in the second form of the inductive theorem, since that form gives the simpler results,

$$\begin{aligned}
 \sin r &= \sin 2\pi N_{k+1} \\
 \cos a &= \cos 2(k, k+1) \\
 \cos b &= \sin 2(k, k+1) \\
 \cos c &= 0
 \end{aligned} \tag{31}$$

If the point $S=P$, $Q=K=0$, be chosen as the pole of the sphere, the plane $S=0$ will be the equatorial plane. Letting l represent the latitude and m the longitude of a point on the sphere, then:

$$\sin l = \frac{S}{P} = \frac{2e}{1+e^2} \quad \text{tg } m = \frac{K}{Q} = \text{tg } 2\theta \tag{32}$$

or,

$$e = \text{tg } \frac{1}{2} l \quad m = 2\theta$$

Any definite elliptically polarized light is, therefore, represented by a definite point on a Poincaré Sphere. Its ellipticity is determined by the latitude of the point, and its azimuth by the longitude. Points on the same circle of longitude represent light of the same azimuth but varying ellipticity. Points on the circle of zero longitude represent light of zero azimuth. Points on the same circle of latitude represent light of the same ellipticity but varying azimuth. Points on the equator represent plane polarized light. Ellipticities equal but opposite in sign are represented by latitudes equal but opposite in sign.

If a given latitude, l , on the sphere, be said to correspond to a given ellipticity, e , when $e = \text{tg} \frac{1}{2} l$, and a given longitude, m , to correspond to a given azimuth, θ , when $m = 2\theta$, any elliptically polarized light is represented by the point on the Poincaré Sphere of corresponding latitude and longitude. The effect of a doubly refracting plate may then be stated as follows:

A doubly refracting plate turns the Poincaré Sphere about an axis in its equator whose longitude corresponds to the azimuth of the plate, through an angle equal to the order of the plate expressed in degrees.

A plate with rotary power, on the other hand, evidently turns the Poincaré Sphere about its pole as an axis.

Since a series of rotations is itself a rotation, the effect of any number of doubly refracting plates is evidently equivalent to the effect of a single doubly refracting plate and a plate with rotary power.

A sphere constructed to show these relations has proven a great convenience in tracing the effects of doubly refracting plates, and in checking the results of the various formulae. The sphere is mounted, free to rotate about an axis in its equatorial plane, the axis in turn being movable in longitude. The sphere is provided with three circles: a circle of latitude, a circle of longitude and a circle to measure the rotation about its axis. The latitude circle is graduated directly in ellipticity instead of degrees. The longitude circle is graduated in double degrees, to read azimuths directly. The circle for measuring rotation is graduated directly in orders of doubly refracting plates. To ob-

tain the effect of a doubly refracting plate upon any elliptically polarized light, it is only necessary to place the axis of the sphere at the azimuth of the plate, locate on the sphere by means of the latitude and longitude circles the point corresponding to the incident light and rotate the sphere through an angle equal to the order of the plate. The new readings given by the point on the latitude and longitude circles then show directly the ellipticity and azimuth of the emergent light.

APPLICATIONS OF THE THEOREM

6. THE EFFECT OF A SINGLE PLATE

The incident light is referred to its major and minor axes, and the angle between its major axis and the plane of the ordinary vibration in the plate is θ_0 .

$$\begin{aligned} P_0 &= P_0 \\ Q_0 &= P_0 \frac{1 - e_0^2}{1 + e_0^2} \\ K_0 &= 0 \\ S_0 &= P_0 \frac{2e_0}{1 + e_0^2} \end{aligned} \quad (16)$$

$$\begin{aligned} P_1 &= P_0 \\ Q_1 &= P_0 \frac{1 - e_0^2}{1 + e_0^2} \cos 2\theta_0 \\ K_1 &= P_0 \frac{1 - e_0^2}{1 + e_0^2} \sin 2\theta_0 \cos 2\pi N_1 + P_0 \frac{2e_0}{1 + e_0^2} \sin 2\pi N_1 \\ S_1 &= -P_0 \frac{1 - e_0^2}{1 + e_0^2} \sin 2\theta_0 \sin 2\pi N_1 + P_0 \frac{2e_0}{1 + e_0^2} \cos 2\pi N_1 \end{aligned} \quad (33)$$

If the incident light is plane polarized, $e_0 = 0$ and $S_0 = 0$, and the equations reduce to:

$$\begin{aligned} P_1 &= P_0 \\ Q_1 &= P_0 \cos 2\theta_0 \\ K_1 &= P_0 \sin 2\theta_0 \cos 2\pi N_1 \\ S_1 &= -P_0 \sin 2\theta_0 \sin 2\pi N_1 \end{aligned} \quad (34)$$

The direction of the major axis of the resultant ellipse is given by (22)

$$\operatorname{tg} 2\theta_1 = \frac{K_1}{Q_1} = \operatorname{tg} 2\theta_0 \cos 2\pi N_1 \quad (35)$$

and its ellipticity by (23),

$$e_1 = \frac{P_1 - 1}{S_1} \frac{P_1^2 - S_1^2}{1 - 1/\sqrt{1 - \sin^2 2\theta_0 \sin^2 2\pi N_1}} = \frac{1 - 1/\sqrt{1 - \sin^2 2\theta_0 \sin^2 2\pi N_1}}{\sin 2\theta_0 \sin 2\pi N_1} \quad (36)$$

This may be expanded:

$$e_1 = -\frac{1}{2} \sin 2\theta_0 \sin 2\pi N_1 (1 + \frac{1}{4} \sin^2 2\theta_0 \sin^2 2\pi N_1 + \dots) \quad (37)$$

If N_1 is very small:

$$e_1 = -\pi N_1 \sin 2\theta_0 \quad (38)$$

If $\theta_0 = 45^\circ$:

$$e_1 = -\frac{1 - \cos 2\pi N_1}{\sin 2\pi N_1} = -\operatorname{tg} \pi N_1 \quad (39)$$

which is the maximum ellipticity which can be produced in plane polarized light by the plate.

7. STOKES'S ELLIPTIC ANALYZER

Stokes¹ compensates for the ellipticity of the incident light in two positions of the compensator, and in both positions extinguishes with a nicol.

Emerging from the compensator the light is plane polarized, therefore from (33):

$$S_1 = -P_0 \frac{1 - e_0^2}{1 + e_0^2} \sin 2\theta_0 \sin 2\pi N_1 + P_0 \frac{2e_0}{1 + e_0^2} \cos 2\pi N_1 = 0$$

From which:

$$\frac{2e_0}{1 - e_0^2} = \sin 2\theta_0 \operatorname{tg} 2\pi N_1 \quad (40)$$

The position of the nicol is determined by the plane of polarization of the compensated light. From (22) and (33):

¹Stokes, G. G. *Phil. Mag.* (4), vol. 2, pp. 420-21, 1851.

$$\operatorname{tg} 2\theta_1 = \frac{K_1}{Q_1} = \frac{P_o \frac{1-e_o^2}{1+e_o^2} \sin 2\theta_o \cos 2\pi N_1 + P_o \frac{2e_o}{1+e_o^2} \sin 2\pi N_1}{P_o \frac{1-e_o^2}{1+e_o^2} \cos 2\theta_o}$$

Substituting the value of $\frac{2e_o}{1+e_o^2}$ and simplifying:

$$\operatorname{tg} 2\theta_1 = \frac{\operatorname{tg} 2\theta_o}{\cos 2\pi N_1}$$

$$\cos 2\pi N_1 = \frac{\operatorname{tg} 2\theta_o}{\operatorname{tg} 2\theta_1}$$

Letting $e_o = \operatorname{tg} \omega$,

$$\cos 2\omega = \frac{1-e_o^2}{1+e_o^2} = \frac{1}{\sqrt{\left[\frac{2e_o}{1+e_o^2}\right]^2 + 1}}$$

Substituting values for $\frac{2e_o}{1+e_o^2}$ and for $\operatorname{tg} 2\pi N_1$:

$$\cos 2\omega = \frac{\cos 2\theta_1}{\cos 2\theta_o}$$

Using Stokes's notation:

$$r' - r = \frac{\pi}{2} - 2\theta_1 = \frac{\pi}{2} - 2r = n$$

$$R' - R = \frac{\pi}{2} - 2\theta_o = \frac{\pi}{2} - 2R = c$$

(41)

and the equations reduce to Stokes's form:

$$\cos 2\omega = \frac{\sin(r' - r)}{\sin(R' - R)} = \frac{\sin n}{\sin c} \quad \cos 2\pi N_1 = \frac{\operatorname{tg}(r' - r)}{\operatorname{tg}(R' - R)} = \frac{\operatorname{tg} n}{\operatorname{tg} c} \quad (42)$$

or in another form usually more convenient for computation:

$$\operatorname{tg} \omega = e_o = \sqrt{\frac{\operatorname{tg} \frac{1}{2}(c-n)}{\operatorname{tg} \frac{1}{2}(c+n)}} \quad \operatorname{tg} \pi N_1 = \sqrt{\frac{\sin(c-n)}{\sin(c+n)}} \quad (43)$$

In introducing Stokes's notation it is assumed that the two readings of the compensator are complementary when the major axis of the original ellipse is taken as the axis of reference. Care must be taken to choose two out of the possible four sets of read-

ings, such that this is the case, since otherwise the final formulæ will give the reciprocals of $\text{tg } \omega$ and $\text{tg } \pi N_1$, instead of the quantities themselves. To insure the proper choice it is necessary that

$$\frac{\cos(c-n)}{\cos 2\pi N_1} > 0$$

If N_1 is not known beforehand with sufficient accuracy to determine the sign of $\cos 2\pi N_1$, the direction of the major axis of the ellipse must be determined roughly by some independent method.

If the order of the compensator, N_1 , is accurately known in advance, it is not necessary to read both compensator and nicol, the reading of either one alone being sufficient to determine the ellipticity of the incident light. The following equations are readily obtained:

$$\text{tg } 2\omega = \text{tg } 2\pi N_1 \cos c \tag{44}$$

and

$$\sin 2\omega = \sin 2\pi N_1 \cos n \tag{45}$$

For small ellipticities the first equation is preferable, and for large, the second.

The equations so far have been given in terms of the rotation of the nicol relative to the compensator. It is sometimes convenient to read the rotation of the nicol relative to fixed axes. Calling ρ and ρ' the two rotations of the nicol relative to fixed axes, and ν their difference:

$$\rho = R - r \qquad \rho' = R' - r' = r - R$$

$$\nu = \rho' - \rho = 2(r - R) = c - n$$

Eliminating $(c+n)$ between the equations:

$$\text{tg } \omega = e_o = \sqrt{\frac{\text{tg } \frac{1}{2}(c-n)}{\text{tg } \frac{1}{2}(c+n)}} \quad \text{and} \quad \text{tg } \pi N_1 = \sqrt{\frac{\sin(c-n)}{\sin(c+n)}} \tag{43}$$

the following equation is obtained:

$$\text{tg } \omega = e_o = \sqrt{\frac{1 - \cos \nu}{\text{tg}^2 \pi N_1 \left[1 \pm \sqrt{1 - \frac{\sin^2 \nu}{\text{tg}^4 \pi N_1}} \right]}} \tag{46}$$

where the upper or lower sign is taken according as $\cos v$ is positive or negative, i.e. according as $\cos 2\pi N_1$ is positive or negative.

None of the preceding equations involving the double rotation of compensator and nicol determine the sign of e_o since they are all affected by an ambiguity of sign. To determine the sign of e_o it is necessary to use the equation:

$$\frac{2e_o}{1-e_o^2} = \operatorname{tg} 2\omega = \sin 2\theta_o \operatorname{tg} 2\pi N_1 = \sin 2R \operatorname{tg} 2\pi N_1 \quad (40)$$

giving $\sin 2\theta_o$ and $\operatorname{tg} 2\pi N_1$ their proper signs.

The direction of the major axis of the ellipse is evidently given by either $\frac{1}{2}(\rho + \rho')$, or $\frac{1}{2}(R + R') - \frac{\pi}{4}$.

8. HALFSHADE ANALYZING SYSTEMS

These will be discussed under two types: *Type A* and *Type B*. In *Type A* the two halves of the halfshade consist of analyzers whose principal azimuths make a slight angle with each other. In *Type B* the two halves consist of doubly refracting plates whose principal azimuths are the same but whose orders are different. The light emerging from the plates is analyzed by a nicol.

Type A.

Lippich Half Nicol.¹

Brace Sensitive Strip.²

Jellett Split Prism.³

Cornu-Jellett Split Nicol.⁴

Lippich Split Nicol.¹

¹Lippich, F. *Naturwiss. Jahrbuch "Lotos,"* vol. 2, 1880; *Wien. Ber.*, vol. 85, pp. 268-326, 1882; *Ztschr. f. Instk.*, vol. 2, pp. 167-74, 1882; *Wien. Ber.*, vol. 91, pp. 1059-96, 1885; *Ztschr. f. Instk.*, vol. 12, pp. 333-42, 1892; *Ztschr. f. Instk.*, vol. 14, pp. 326-27, 1894; *Wien. Ber.*, vol. 105, pp. 317-61, 1896.

²Brace, D. B. *Phil. Mag.* (6), vol. 5, pp. 161-69, 1903.

³Jellett, J. H. *Brit. Assoc. Report*, vol. 2, p. 13, 1860.

⁴Cornu, Alfred. *Bull. de la Soc. Chim.*, vol. 14, p. 140, 1870.

Soleil Biquartz.¹

Poynting Biquartz.²

Poynting Sugar Cell.²

Of these halfshade analyzing systems, all except the last three analyze the light in two directions making a slight angle with each other. The last three do not properly come under the general theory here given, but an elementary consideration shows that the emergent intensities are the same as if the biquartz or sugar cell were removed and the two halves of the analyzing nicol rotated in the opposite direction through the same angles as those produced by the rotation of the quartz or sugar. The theory is then identical (for monochromatic light) with that of the split nicols.

In the first two systems, the intensities of the emergent light when the incident light is unpolarized are not the same but have the ratio $1-\kappa$ where:

$$\kappa = \sin^2(\mathbf{I}, \mathbf{I}') + \kappa_0 \cos^2(\mathbf{I}, \mathbf{I}')$$

$\angle(\mathbf{I}, \mathbf{I}')$ being the angle between the two halves of the analysing system, and $1-\kappa_0$, the ratio when $\angle(\mathbf{I}, \mathbf{I}')=0$. For the Brace Sensitive Strip $\kappa_0=0$, and for the Lippich half nicol $\kappa_0=.08$. The theory of the other systems may be obtained from that of the first two by making $\kappa=0$.

Referring the incident light to its major axis (16):

$$P_0 = P_0$$

$$Q_0 = P_0 \frac{1-e_0^2}{1+e_0^2}$$

For a match of intensity of the two halves of the field:

$$P_1 + Q_1 = (1-\kappa)(P'_1 + Q'_1)$$

or from (11)

$$P_0 + P_0 \frac{1-e_0^2}{1+e_0^2} \cos 2(\mathbf{O}, \mathbf{I}) = (1-\kappa) [P_0 + P_0 \frac{1-e_0^2}{1+e_0^2} \cos 2(\mathbf{O}, \mathbf{I}')]]$$

¹Soleil, —. *C. R.*, vol. 20, p. 1805, 1845.

²Poynting, J. H. *Phil. Mag.* (5), vol. 10, pp. 18-21, 1880.

which reduces to

$$\kappa + \frac{1 - e_0^2}{1 + e_0^2} [\cos 2(\alpha, \beta) - (1 - \kappa) \cos 2(\alpha, \beta')] = 0$$

Writing $(\alpha, \beta) = (\alpha, \beta') - (\beta, \beta')$, expanding and collecting terms:

$$\frac{1 + e_0^2}{1 - e_0^2} \kappa - [1 - \kappa - \cos 2(\beta, \beta')] \cos 2(\alpha, \beta') + \sin 2(\beta, \beta') \sin 2(\alpha, \beta') = 0$$

Writing $e_0 = \operatorname{tg} \omega$ and solving for $\cos 2(\alpha, \beta')$ and $\sin 2(\alpha, \beta')$, this gives after some reduction:

$$\begin{aligned} \cos 2(\alpha, \beta') &= + \frac{a \sec 2\omega - b \sqrt{c - \operatorname{tg}^2 2\omega}}{c + 1} \\ \sin 2(\alpha, \beta') &= - \frac{b \sec 2\omega + a \sqrt{c - \operatorname{tg}^2 2\omega}}{c + 1} \end{aligned} \quad (47)$$

where

$$a = \frac{1}{\kappa} [1 - \kappa - \cos 2(\beta, \beta')]$$

$$b = \frac{1}{\kappa} \sin 2(\beta, \beta')$$

$$c = \frac{2}{\kappa^2} (1 - \kappa) [1 - \cos 2(\beta, \beta')] = 4(1 - \kappa_0) \frac{\sin^2 2(\beta, \beta')}{[(1 + \kappa_0) - (1 - \kappa_0) \cos 2(\beta, \beta')]^2}$$

$$a^2 + b^2 = c + 1$$

If $(\alpha, \beta) = (\alpha, \beta')_0$ for $e_0 = 0$, and $a = (\alpha, \beta') - (\alpha, \beta')_0$: where a represents the error in setting when ellipticity is present.

$$\sin 2a = \frac{\sqrt{c} \sec 2\omega - \sqrt{c - \operatorname{tg}^2 2\omega}}{c + 1} \quad (48)$$

Substituting $e_0 = \operatorname{tg} \omega$ and expanding in ascending powers of e_0 ,

$$\begin{aligned} \sin 2a &= \frac{2}{\sqrt{c}} e_0^2 + \frac{2}{\sqrt{c}} \frac{c+1}{c} e_0^4 + \frac{2}{\sqrt{c}} \frac{(c+1)^2 + 1}{c^2} e_0^6 \\ &\quad + \frac{2}{\sqrt{c}} \frac{(c+1)^3 + 3(c+1)}{c^3} e_0^8 \\ &\quad + \frac{2}{\sqrt{c}} \frac{(c+1)^4 + 10(c+1)^2 + 2(c+1) + 1}{c^4} e_0^{10} + \dots \end{aligned} \quad (49)$$

If $\kappa = 0$, $c = \infty$ and $a = 0$ for all values of e_0 . It is evident that if $\kappa = 0$, the setting is independent of the ellipticity of the incident

light, and depends only on the azimuth of its major axis, the minor axis always bisecting the angle between the principal azimuths of the two halves of the analyzing system. If $\kappa \neq 0$ the setting depends not only on the azimuth of the major axis, but also upon the ellipticity of the incident light. The series for $\sin 2\alpha$ is rapidly convergent, and for small values of e_0 and κ may be written:

$$\alpha = \frac{1}{\sqrt{c}} e_0^2 \tag{50}$$

Or expressed in degrees:

$$\begin{aligned} \alpha^\circ &= k e_0^2 \\ &= \frac{1}{1,745 \times 10^{-2} \sqrt{c}} e_0^2 \\ &= \frac{1}{3,49 \times 10^{-2} \sqrt{1 - \kappa_0}} \cdot \frac{(1 + \kappa_0) - (1 - \kappa_0) \cos 2(I, I')}{\sin 2(I, I')} e_0^2 \end{aligned}$$

The coefficient k is infinite for $\chi(I, I') = 0$, falls to a minimum for

$$\cos 2(I, I') = \frac{1 - \kappa_0}{1 + \kappa_0}$$

and then rises again as $\chi(I, I')$ increases. For the Lippich half nicol this minimum, $\chi(I, I') = 15.8^\circ$, lies outside the range of practical use. The series is, of course, not convergent for large values of k , but it gives sufficiently accurate results for all practical values of $\chi(I, I')$. The value of k , for the Lippich half nicol ($\kappa_0 = .08$) is plotted in the curve, figure 2. Plotted on the same scale, the value of k , for the Brace sensitive strip ($\kappa_0 = 0$) could not be distinguished from the axis of abscissae. For the Brace sensitive strip α is negligible, but for the Lippich half nicol it may be appreciable in accurate work even with small ellipticities. If $\chi(I, I') = 1^\circ$ and $e_0 = .0085$, then $\alpha = .01^\circ$, the error introduced by neglecting it being greater for smaller values of $\chi(I, I')$ and larger values of e_0 . Care must therefore be taken in using the Lippich half nicol to ensure the absence of ellipticity, or, if present, to eliminate the error produced by it. In measurements on naturally rotating substances this error can only be eliminated by reversing the angle between the two halves of the field [changing

the sign of the angle (I, I') changes the sign of k]. In measurements on magnetic or electrical rotation, it may also be eliminated

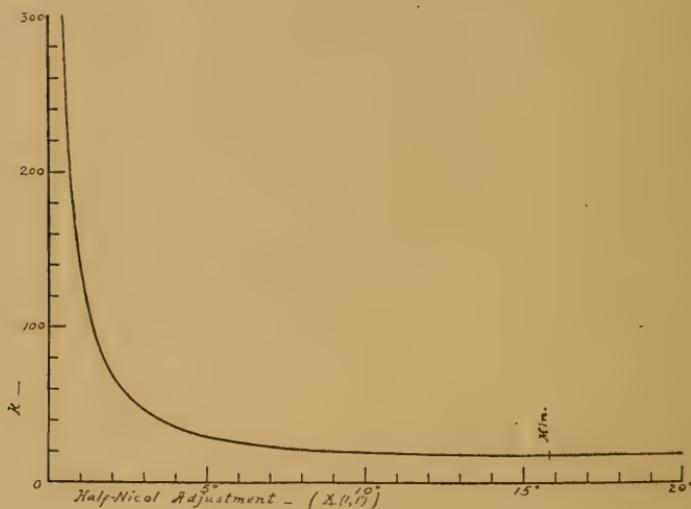


Fig. 2

by reversing the rotation. If the effects are measured along the lines of force, the rotation is reversed by reversing the field. If the effects are measured at right angles to the lines of force the rotation can only be reversed by rotating either the field or the optical system through 90° .

Type B.

Bravais Biplate.¹

Brace Elliptic Halfshade.²

Laurent Saccharimeter Halfshade.³

The Bravais Biplate consists of two halves of a doubly refract-

¹Bravais, A. *Ann. de Chim. et de Phys.* (3), vol. 43, pp. 131-35, 1855.

²Brace, D. B. *Phys. Rev.*, vol. 18, pp. 70-88, 1904; *Phys. Rev.*, vol. 19, pp. 218-30, 1904.

³Laurent, L. *Dingler Journ.*, vol. 223, pp. 608-14, 1877; *C. R.*, vol. 89, pp. 665-67, 1879.

ing plate whose order is approximately $\frac{1}{4}$, mounted edge to edge with an angle of 90° between their principal azimuths. It may be considered as composed of two halves whose principal azimuths are the same and whose orders are equal but of opposite sign.

The Brace Elliptic Halfshade consists of a thin piece of mica covering only half the field, and mounted in balsam between carefully selected cover glasses, free from double refraction.

The Laurent Saccharimeter Halfshade consists of a doubly refracting plate whose order is $\frac{1}{2}$ for some selected wave-length (usually the D line of sodium) and covering half the field. In its best form, it is either mounted in a medium of the same average refractive index, or the other half of the field is covered by a glass plate of the same average index.

All three may be considered as special cases of a halfshade whose two halves have the same principal azimuth, but different orders, and which transmit the same amount of unpolarized light. The emergent light is analyzed by a nicol.

If the incident light is referred to its major and minor axes, the angle between the major axis and the principal azimuth of the halfshade being χ (0.1), between the halfshade and nicol χ (1.2), and the orders of the two halves of the halfshade, N_1 and N'_1 , the following equations result:

$$\begin{aligned}
 P_o &= P_o \\
 Q_o &= P_o \frac{1 - e_o^2}{1 + e_o^2} \\
 K_o &= 0 \\
 S_o &= P_o \frac{2e_o}{1 + e_o^2}
 \end{aligned}
 \tag{16}$$

For a match of intensity of the two halves of the field:

$$P_2 + Q_2 = P'_2 + Q'_2$$

Since

$$P_2 = P'_2 = P_o, \quad Q_2 - Q'_2 = 0$$

or, from (14)

$$\begin{aligned}
& P_o \frac{1-e_o^2}{1+e_o^2} \left| \begin{array}{l} +\cos 2(o, 1) \cos 2(1, 2) \\ -\sin 2(o, 1) \sin 2(1, 2) \cos 2\pi N'_1 \end{array} \right| \\
& + P_o \frac{2e_o}{1+e_o^2} \sin 2(1, 2) \sin 2\pi N_1 \\
& - P_o \frac{1-e_o^2}{1+e_o^2} \left| \begin{array}{l} +\cos 2(o, 1) \cos 2(1, 2) \\ -\sin 2(o, 1) \sin 2(1, 2) \cos 2\pi N'_1 \end{array} \right| \\
& - P_o \frac{2e_o}{1+e_o^2} \sin 2(1, 2) \sin 2\pi N'_1 = 0
\end{aligned}$$

Dividing through by $P_o \frac{1-e_o^2}{1+e_o^2}$ cancelling like terms and putting

$$\frac{2e_o}{1-e_o^2} = \text{tg } 2\omega = t$$

$$\begin{aligned}
& \sin 2(1, 2) \left| \begin{array}{l} \sin 2(o, 1) (\cos 2\pi N_1 - \cos 2\pi N'_1) \\ -t (\sin 2\pi N_1 - \sin 2\pi N'_1) \end{array} \right| = 0
\end{aligned}$$

If $\sin 2(1, 2) = 0$, it is a match for all values of t , N_1 , N'_1 and $\angle(o, 1)$, hence the system is useless. If $\sin 2(1, 2) \neq 0$:

$$\sin 2(o, 1) (\cos 2\pi N_1 - \cos 2\pi N'_1) - t (\sin 2\pi N_1 - \sin 2\pi N'_1) = 0$$

Writing $N = \frac{1}{2}(N_1 + N'_1)$, $\Delta N = \frac{1}{2}(N_1 - N'_1)$, expanding, collecting terms and dividing by $-\cos 2\pi N \sin 2\pi \Delta N$:

$$t + \sin 2(o, 1) \text{tg } 2\pi N = 0 \quad (52)$$

It is evident that, with a known average order, N , of the halfshade, a match enables one to determine the ellipticity of the incident light provided the azimuth of its major axis be known, and conversely to determine the azimuth of its major axis provided its ellipticity be known.

In measuring ellipticities such a system will give a match only when $t < \text{tg } 2\pi N$, but since in measuring ellipticities a compensator is always used to increase the sensibility, this limitation is of no significance.

Balanced Halfshades.—A balanced halfshade is defined as one in which $N = 0$ and therefore $\text{tg } 2\pi N = 0$. Such a halfshade is especially convenient from a theoretical standpoint, since it gives

a match with plane polarized light ($t=0$) only, independent of the value of $\chi(0,1)$, and thereby greatly simplifies the formulae. The Bravais biplate when properly made is a balanced halfshade, but those made commercially do not always show perfect balance. This quality would make the Bravais biplate preferable to the Brace halfshade, were it not for the greatly increased sensibility obtainable with the latter (see discussion of sensibility, section 10). Experiments are now in progress with a view to producing a balanced Brace halfshade.

Laurent Saccharimeter Halfshade.—If as a special case $e_0=0$, then $t=0$ and the light is plane polarized. In case $\text{tg } 2\pi N \neq 0$, a match is obtained only when $\sin 2(0,1)=0$. This is the condition of the Laurent Saccharimeter halfshade. It is evidently useful only when it is known that the solution investigated introduces no ellipticity, unless the plate should be an achromatic half-wave plate.

9. ELLIPTIC HALFSHADE SYSTEMS WITH COMPENSATOR

The halfshade may be either a Bravais biplate or a Brace elliptic halfshade. The compensator may be any plane parallel doubly refracting plate, preferably one whose order, $N < 1/4$, because of the greater chromatic dispersion of higher orders. For use with the Brace elliptic halfshade, the Brace compensator is preferable because its chromatic dispersion is proportional to that of the halfshade. The Brace compensator is constructed like the halfshade, but the piece of mica covers the whole field instead of only one-half.

Two arrangements will be considered:

A. \Rightarrow Elliptic Halfshade \Rightarrow Compensator \Rightarrow Nicol.

B. \Rightarrow Compensator \Rightarrow Elliptic Halfshade \Rightarrow Nicol.

For a match of intensity of the two halves of the field:

$$P_3 + Q_3 = P'_3 + Q'_3$$

But since in general, $P_3 = P'_3 = P_0$, $Q_3 = Q'_3$.

The formal difference between Q_3 and Q'_3 lies wholly in the difference of thickness of the two halves of the halfshade. No generality is lost by referring the incident light to its major and minor axes. Then from the general equations: (15) and (16)

$$P_o = P_o$$

$$Q_o = P_o \frac{1 - e_o^2}{1 + e_o^2}$$

$$K_o = 0$$

$$S_o = P_o \frac{2e_o}{1 + e_o^2}$$

and

$$Q_3 = P_o \frac{1 - e_o^2}{1 + e_o^2} \left| \begin{array}{l} + \cos 2(0, 1) \cos 2(1, 2) \cos 2(2, 3) \\ - \cos 2(0, 1) \sin 2(1, 2) \sin 2(2, 3) \dots \dots \cos 2\pi N_2 \\ - \sin 2(0, 1) \sin 2(1, 2) \cos 2(2, 3) \cos 2\pi N_1 \\ - \sin 2(0, 1) \cos 2(1, 2) \sin 2(2, 3) \cos 2\pi N_1 \cos 2\pi N_2 \\ + \sin 2(0, 1) \dots \dots \sin 2(2, 3) \sin 2\pi N_1 \sin 2\pi N_2 \end{array} \right| \quad (53)$$

$$+ P_o \frac{2e_o}{1 + e_o^2} \left| \begin{array}{l} + \sin 2(1, 2) \cos 2(2, 3) \sin 2\pi N_1 \\ + \cos 2(1, 2) \sin 2(2, 3) \sin 2\pi N_1 \cos 2\pi N_2 \\ + \dots \dots \sin 2(2, 3) \cos 2\pi N_1 \sin 2\pi N_2 \end{array} \right|$$

A. \Rightarrow Elliptic Halfshade \Rightarrow Compensator \Rightarrow Nicol

For this arrangement the symbols have the following significance:

Order of the one half of halfshade $= N_1$

Order of other half of halfshade $= N'_1$

Order of compensator $= N_2$

Angle between major axis of incident light and principal azimuth of halfshade $= \angle(0, 1)$

Angle between halfshade and compensator $= \angle(1, 2)$

Angle between compensator and nicol $= \angle(2, 3)$

This arrangement is useful in measuring small ellipticities with a compensator of low order, since it enables the halfshade to be conveniently placed relatively farther from the observing telescope and is easily applied to the ordinary polariscope.

For a match, $Q_3 - Q'_3 = 0$, or

$$\begin{aligned}
 & P \frac{1 - e_o^2}{1 + e_o^2} \left| \begin{array}{l} -\sin 2(0, 1) \sin 2(1, 2) \cos 2(2, 3) \dots \dots (\cos 2\pi N_1 \\ -\cos 2\pi N'_1) \\ -\sin 2(0, 1) \cos 2(1, 2) \sin 2(2, 3) \cos 2\pi N_2 (\cos 2\pi N_1 \\ -\cos 2\pi N'_1) \\ +\sin 2(0, 1) \dots \dots \sin 2(2, 3) \sin 2\pi N_2 (\sin 2\pi N_1 \\ -\sin 2\pi N'_1) \end{array} \right| \\
 & + P \frac{2e_o}{1 + e_o^2} \left| \begin{array}{l} +\sin 2(1, 2) \cos 2(2, 3) \dots \dots (\sin 2\pi N_1 - \sin 2\pi N'_1) \\ +\cos 2(1, 2) \sin 2(2, 3) \cos 2\pi N_2 (\sin 2\pi N_1 - \sin 2\pi N'_1) \\ + \dots \dots \sin 2(2, 3) \sin 2\pi N_2 (\cos 2\pi N_1 - \cos 2\pi N'_1) \end{array} \right| \\
 & = 0
 \end{aligned}$$

Substituting $N_1 = N + \Delta N$, $N'_1 = N - \Delta N$, expanding, canceling like terms and dividing by $2 P \frac{1 - e_o^2}{1 + e_o^2} \cos 2\pi N \sin 2\pi \Delta N$, since $\sin 2\pi \Delta N = 0$ would give a match for any value of e_o and hence a useless system:

$$\begin{aligned}
 & \sin 2(0, 1) \left| \begin{array}{l} +\sin 2(1, 2) \cos 2(2, 3) \operatorname{tg} 2\pi N \\ +\cos 2(1, 2) \sin 2(2, 3) \operatorname{tg} 2\pi N \cos 2\pi N_2 \\ + \dots \dots \sin 2(2, 3) \dots \dots \sin 2\pi N_2 \end{array} \right| \\
 & + \frac{2e_o}{1 - e_o^2} \left| \begin{array}{l} +\sin 2(1, 2) \cos 2(2, 3) \\ +\cos 2(1, 2) \sin 2(2, 3) \dots \dots \cos 2\pi N_2 \\ - \dots \dots \sin 2(2, 3) \operatorname{tg} 2\pi N \sin 2\pi N_2 \end{array} \right| = 0
 \end{aligned} \tag{54}$$

If the halfshade is balanced, $\operatorname{tg} 2\pi N = 0$ and:

$$\begin{aligned}
 & \sin 2(0, 1) \sin 2(2, 3) \sin 2\pi N_2 \\
 & + \frac{2e_o}{1 - e_o^2} \left| \begin{array}{l} +\sin 2(1, 2) \cos 2(2, 3) \\ +\cos 2(1, 2) \sin 2(2, 3) \cos 2\pi N_2 \end{array} \right| = 0
 \end{aligned}$$

Or

$$\frac{2e_o}{1 - e_o^2} = \frac{\sin 2(0, 1) \sin 2(2, 3) \sin 2\pi N_2}{\sin 2(1, 3) \cos 2\pi N_2 + \sin 2(1, 2) \cos 2(2, 3) (1 - \cos 2\pi N_2)} \tag{55}$$

For low values of the compensator (N_2 small) this may be expanded in a series provided $\sin 2(1,3)$ is not too small.

$$\frac{2e_o}{1-e_o^2} = \frac{\sin 2(0,1) \sin 2(2,3)}{\sin 2(1,3)} \operatorname{tg} 2\pi N_2 \left\{ 1 - \frac{\sin 2(1,2) \cos 2(2,3)}{\sin 2(1,3)} \cdot \frac{1 - \cos 2\pi N_2}{\cos 2\pi N_2} + \dots \right\}$$

For maximum sensibility the nicol should be set for minimum intensity of the transmitted light. If e_o is small this is approximately at 90° to the major axis of the original ellipse, so that the nicol may be set at 90° with no appreciable loss of sensibility. If this be done, $\chi(0,3) = 90^\circ$ and $\sin 2(0,1) = \sin 2(1,3)$. Writing $\chi(1,3) = \alpha$, and $\chi(2,3) = \psi$, where ψ measures the rotation of the compensator:

$$\frac{2e_o}{1-e_o^2} = -\sin 2\psi \operatorname{tg} 2\pi N_2 \left\{ 1 - \frac{\sin 2(\alpha - \psi) \cos 2\psi}{\sin 2\alpha} \cdot \frac{1 - \cos 2\pi N_2}{\cos 2\pi N_2} + \dots \right\}$$

or

$$e_o = -\operatorname{tg} \pi N_2 \sin 2\psi \frac{1 - e_o^2}{1 - \operatorname{tg}^2 \pi N_2} \left\{ 1 - \frac{\sin 2(\alpha - \psi) \cos 2\psi}{\sin 2\alpha} \cdot \frac{1 - \cos 2\pi N_2}{\cos 2\pi N_2} + \dots \right\}$$

Substituting in $1 - e_o^2$ the approximate value, $e_o = -\operatorname{tg} \pi N_2 \sin 2\psi$, and expanding in a series to quantities of the second order in N_2

$$e_o = -\operatorname{tg} \pi N_2 \sin 2\psi [1 - \operatorname{tg}^2 \pi N_2 (\cos^2 2\psi - \cot 2\alpha \sin 4\psi) + \dots] \quad (56)$$

For any given value of α , the maximum value of

$$\cos^2 2\psi - \cot 2\alpha \sin 4\psi \text{ is } \frac{1}{2}(1 + \sqrt{1 + 4 \cot^2 2\alpha}).$$

Then the approximate formula

$$e_o = -\operatorname{tg} \pi N_2 \sin 2\psi \quad (57)$$

may be used provided $\frac{1}{2}(1 + \sqrt{1 + 4 \cot^2 2\alpha}) \operatorname{tg}^2 \pi N_2$

is negligible. The curve, figure 3, is plotted on the assumption of a maximum allowable error of 1 per cent. The abscissae represent the angle, α , between halfshade and nicol, while the ordinates give the corresponding maximum allowable order of the

compensator, N_2 . For an error not greater than 1 per cent, to be introduced by using the approximate formula (57), $2\pi N_2$ must not be greater than 11.5° in any case, and the further α lies from 45° , the smaller the allowable value. Since the angle be-

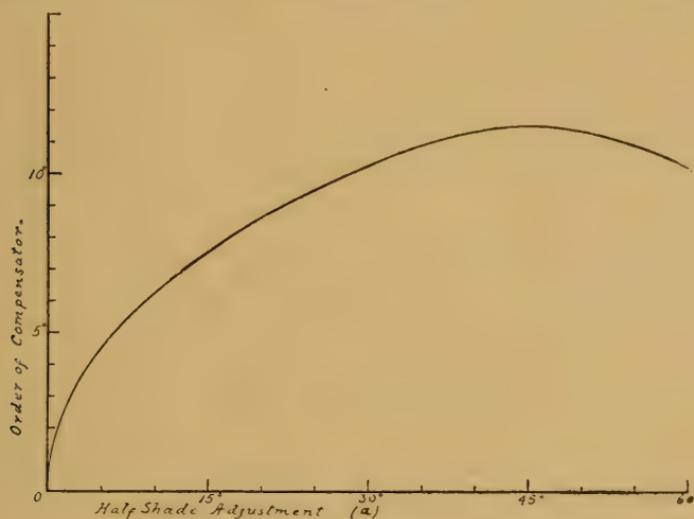


Fig. 3

tween halfshade and nicol regulates the sensibility of the system and is necessarily small for large values of ΔN , the approximate formula can only be used where ΔN is small enough to give satisfactory sensibility at 45° . For large values of ΔN , as in the Bravais biplate ($\Delta N = \frac{1}{4}$), the approximate formula is therefore not available, and it would be necessary, if this arrangement were used, to fall back upon the rigorous formula (55). As this involves the necessity of reading not only the compensator but also the halfshade rotation, it is preferable to use the arrangement *B*.

If the halfshade is not balanced, a conveniently usable formula can only be obtained when $\chi(1,3) = 45^\circ$, *i.e.* when the halfshade is placed at 45° to the analyzing nicol. This of course requires a sufficiently low value of ΔN to give satisfactory sensibility. Letting $\chi(0,1) = -\theta$, and $\chi(2,3) = \psi$, then $\chi(1,2) = \frac{\pi}{4} - \psi$ and the formula (54) reduces to

$$\begin{aligned} & \left. \begin{aligned} & \sin 2\theta + \cos^2 2\psi \operatorname{tg} 2\pi N \\ & + \sin^2 2\psi \operatorname{tg} 2\pi N \cos 2\pi N_2 \\ & + \sin 2\psi \dots \sin 2\pi N_2 \end{aligned} \right| \\ & - \frac{2e_o}{1-e^2} \left. \begin{aligned} & + \cos^2 2\psi \\ & + \sin^2 2\psi \dots \cos 2\pi N_2 \\ & - \sin 2\psi \operatorname{tg} 2\pi N \sin 2\pi N_2 \end{aligned} \right| = 0 \end{aligned}$$

Substituting $1 - \sin^2 2\psi$ for $\cos^2 2\psi$, $2 \sin^2 \pi N_2$ for $1 - \cos 2\pi N_2$, collecting terms and solving for $\frac{2e_o}{1-e^2}$.

$$\frac{2e_o}{1-e^2} = \sin 2\theta \frac{\operatorname{tg} 2\pi N + \sin 2\pi N_2 \sin 2\psi - 2 \sin^2 \pi N_2 \operatorname{tg} 2\pi N \sin^2 2\psi}{1 - \sin 2\pi N_2 \operatorname{tg} 2\pi N \sin 2\psi - 2 \sin^2 \pi N_2 \sin^2 2\psi} \quad (58)$$

If the ellipticity of the incident light is zero, the numerator of this expression is zero, from which:

$$\operatorname{tg} 2\pi N = -\sin 2\pi N_2 \sin 2\psi + 2 \sin^2 \pi N_2 \operatorname{tg} 2\pi N \sin^2 2\psi \quad (59)$$

where the second term may usually be neglected. Or

$$\operatorname{tg} 2\pi N = -\frac{\sin 2\pi N_2 \sin 2\psi}{1 - 2 \sin^2 \pi N_2 \sin^2 2\psi} \quad (60)$$

which may be expanded in a series:

$$\operatorname{tg} 2\pi N = -\sin 2\pi N_2 \sin 2\psi (1 + 2 \sin^2 \pi N_2 \sin^2 2\psi + 4 \sin^4 \pi N_2 \sin^4 2\psi + \dots) \quad (61)$$

This is the condition of the apparatus in the work done by Elmén,¹ Morse,² Hagenow,³ and McComb,⁴ on the electric double refraction of liquids. In their work the electric field is placed parallel to the principal azimuth of the halfshade, so that the liquid may be considered as part of the halfshade. N then represents the retardation of the liquid plus the average order of the mica halfshade itself.

¹Elmén, G. W. *Phys. Rev.*, vol. 20, p. 54, 1905.

²Morse, L. B. *Phys. Rev.*, vol. 23, p. 252, 1906.

³Hagenow, C. F. *Phys. Rev.*, vol. 27, p. 196, 1908.

⁴McComb, H. E. *Phys. Rev.*, vol. 27, p. 336, 1908.

If $e \neq 0$, let $\psi = \psi_0$ for the setting on plane polarized light. Then from (59),

$$\operatorname{tg} 2\pi N = -\sin 2\pi N_2 \sin 2\psi_0 + 2\sin^2 \pi N_2 \operatorname{tg} 2\pi N \sin^2 2\psi_0.$$

Substituting this in equation (58)

$$\begin{aligned} \frac{2e_0}{1-e_0^2} &= \\ \sin 2\theta &\frac{\sin 2\pi N_2 (\sin 2\psi - \sin 2\psi_0) - 2\sin^2 \pi N_2 \operatorname{tg} 2\pi N (\sin^2 2\psi - \sin^2 2\psi_0)}{1 - \sin 2\pi N_2 \operatorname{tg} 2\pi N \sin 2\psi - 2\sin^2 \pi N_2 \sin^2 2\psi} \\ &= \sin 2\theta \sin 2\pi N_2 (\sin 2\psi - \sin 2\psi_0) \\ &\quad \frac{1 - \operatorname{tg} \pi N_2 \operatorname{tg} 2\pi N (\sin 2\psi + \sin 2\psi_0)}{1 - \sin 2\pi N_2 \operatorname{tg} 2\pi N \sin 2\psi - 2\sin^2 \pi N_2 \sin^2 2\psi} \end{aligned}$$

Or: $e_0 = \frac{1}{2} \sin 2\theta \sin 2\pi N_2 (\sin 2\psi - \sin 2\psi_0) (1 - e_0^2) \frac{1 - \operatorname{tg} \pi N_2 \operatorname{tg} 2\pi N (\sin 2\psi + \sin 2\psi_0)}{1 - \sin 2\pi N_2 \operatorname{tg} 2\pi N \sin 2\psi - 2\sin^2 \pi N_2 \sin^2 2\psi}$

Substituting $\operatorname{tg} \pi N_2 \cos^2 \pi N_2 = \frac{1}{2} \sin 2\pi N_2$:

$$e_0 = \sin 2\theta \operatorname{tg} \pi N_2 (\sin 2\psi - \sin 2\psi_0) (1 - e_0^2) \cos^2 \pi N_2 \frac{1 - \operatorname{tg} \pi N_2 \operatorname{tg} 2\pi N (\sin 2\psi + \sin 2\psi_0)}{1 - \sin 2\pi N_2 \operatorname{tg} 2\pi N \sin 2\psi - 2\sin^2 \pi N_2 \sin^2 2\psi} \quad (62)$$

For all values of N and N_2 for which this arrangement is useful, the factor:

$$(1 - e_0^2) \cdot \cos^2 \pi N_2 \frac{1 - \operatorname{tg} \pi N_2 \operatorname{tg} 2\pi N (\sin 2\psi + \sin 2\psi_0)}{1 - \sin 2\pi N_2 \operatorname{tg} 2\pi N \sin 2\psi - 2\sin^2 \pi N_2 \sin^2 2\psi}$$

is a correction factor whose value is nearly 1. In it therefore, e_0 and $\sin 2\psi_0$ may be replaced without sensible error by the approximate values:

$$\begin{aligned} e_0 &= \frac{1}{2} \sin 2\theta \sin 2\pi N_2 (\sin 2\psi - \sin 2\psi_0) \\ \sin 2\psi_0 &= -\frac{\operatorname{tg} 2\pi N}{\sin 2\pi N_2} \end{aligned}$$

and the factor expanded in a series according to ascending powers of $\sin 2\psi$. If this be done the factor is, to quantities of the second order in N and N_2 :

$$1 + 2\text{tg}^2 \pi N (1 - \frac{1}{2} \sin^2 2\theta) - \sin^2 \pi N_2 + \frac{1}{2} \sin 2\pi N_2 \text{tg} 2\pi N \cos^2 2\theta \sin 2\psi \\ + 2 \sin^2 \pi N_2 (1 - \frac{1}{2} \sin^2 2\theta) \sin^2 2\psi$$

In practice, θ can not differ much from 45° , if the sensibility is satisfactory, so that in the correction factor, the assumption may be made: $\sin 2\theta = 1$, $\cos 2\theta = 0$. It then becomes:

$$1 + \text{tg}^2 \pi N - \sin^2 \pi N_2 \cos^2 2\psi$$

The correction factor may be neglected if both $\text{tg}^2 \pi N$ and $\sin^2 \pi N_2$ are negligible in comparison with 1. Then:

$$e_0 = \sin 2\theta \text{tg} \pi N_2 (\sin 2\psi - \sin 2\psi_0) \quad (63)$$

Since complementary values of ψ_0 give the same value of $\sin 2\psi_0$, ψ_0 is readily obtained by making two independent settings for a match on plane polarized light and subtracting $\frac{1}{2}$ their sum from 90° .

The value of ψ_0 may evidently be used (equation 61) to calibrate an unknown compensator in terms of a known halfshade and vice versa.

This is the arrangement and the formula used by Skinner and Tool¹ in their work on the optical properties of magnetic metals. In their work, $\sin 2\theta = 1$.

B. \Rightarrow Compensator \Rightarrow Elliptic Halfshade \Rightarrow Nicol

For this arrangement the symbols have the following significance:

Order of compensator $= N_1$.

Order of the one-half of halfshade $= N_2$.

Order of other half of halfshade $= N'_2$.

Angle between major axis of incident light and principal azimuth of compensator $= \chi(0, 1)$.

Angle between compensator and halfshade $= \chi(1, 2)$.

Angle between halfshade and nicol $= \chi(2, 3)$.

¹Skinner, C. A., and Tool, A. Q. *Phil. Mag.* (6), vol. 16, pp. 833-62, 1908.

For a match, $Q_3 - Q'_3 = 0$, or from (53)

$$P \frac{1 - e_o^2}{1 + e_o^2} \left| \begin{array}{l} -\cos 2(0, 1) \sin 2(1, 2) \sin 2(2, 3) \dots \dots (\cos 2\pi N_2 \\ -\cos 2\pi N'_2) \\ -\sin 2(0, 1) \cos 2(1, 2) \sin 2(2, 3) \cos 2\pi N_1 (\cos 2\pi N_2 \\ -\cos 2\pi N'_2) \\ +\sin 2(0, 1) \dots \dots \sin 2(2, 3) \sin 2\pi N_1 (\sin 2\pi N_2 \\ -\sin 2\pi N'_2) \end{array} \right|$$

$$+ P \frac{2e_o}{1 + e_o^2} \left| \begin{array}{l} +\cos 2(1, 2) \sin 2(2, 3) \sin 2\pi N_1 (\cos 2\pi N_2 - \cos 2\pi N'_2) \\ + \dots \dots \sin 2(2, 3) \cos 2\pi N_1 (\sin 2\pi N_2 - \sin 2\pi N'_2) \end{array} \right| = 0$$

Substituting $N_2 = N + \Delta N$, $N'_2 = N - \Delta N$, $\chi(0, 1) = \psi$, expanding, cancelling like terms and dividing by

$$P \frac{1 - e_o^2}{1 + e_o^2} \sin 2(2, 3) \cos 2\pi N \sin 2\pi \Delta N:$$

gives:

$$\left| \begin{array}{l} +\cos 2\psi \sin 2(1, 2) \dots \dots \operatorname{tg} 2\pi N \\ +\sin 2\psi \cos 2(1, 2) \cos 2\pi N_1 \operatorname{tg} 2\pi N \\ +\sin 2\psi \dots \dots \sin 2\pi N_1 \end{array} \right| \quad (64)$$

$$+ \frac{2e_o}{1 - e_o^2} \left| \begin{array}{l} -\cos 2(1, 2) \sin 2\pi N_1 \operatorname{tg} 2\pi N \\ + \dots \dots \cos 2\pi N_1 \end{array} \right| = 0$$

The equation is independent of the angle (2,3), and consequently the match is independent of the azimuth of the analyzing nicol, although the sensibility depends upon it.

If the halfshade is balanced, $\operatorname{tg} 2\pi N = 0$, and

$$\frac{2e_o}{1 - e_o^2} = -\sin 2\psi \operatorname{tg} 2\pi N_1 \quad (65)$$

or

$$e_o = -\frac{1}{2} \operatorname{tg} 2\pi N_1 \sin 2\psi (1 - \frac{1}{4} \operatorname{tg}^2 2\pi N_1 \sin^2 2\psi + \dots) \quad (66)$$

If the halfshade is not balanced and *small ellipticities* are to be measured it is as before convenient to fix the halfshade, this time at 45° to the major axis of the incident light. Then:

$$\chi(0, 2) = \frac{\pi}{4} \quad \chi(1, 2) = \frac{\pi}{4} - \psi$$

By substituting in (64) there results after a slight reduction:

$$\frac{2e_o}{1-e_o^2} = \frac{\text{tg } 2\pi N + \sin 2\pi N_1 \sin 2\psi - 2\sin^2 \pi N_1 \text{tg } 2\pi N \sin^2 2\psi}{1 - 2\sin^2 \pi N_1 - \sin 2\pi N_1 \text{tg } 2\pi N \sin 2\psi} \quad (67)$$

As before, if $\psi_o = \psi$ for $e_o = 0$:

$$e_o = -\frac{1}{2} \sin 2\pi N_1 (\sin 2\psi - \sin 2\psi_o) (1 - e_o^2) \cdot \frac{1 - \text{tg } \pi N_1 \text{tg } 2\pi N (\sin 2\psi + \sin 2\psi_o)}{1 - 2\sin^2 \pi N_1 - \sin 2\pi N_1 \text{tg } 2\pi N \sin 2\psi} \quad (68)$$

or, introducing approximations for e_o and $\sin 2\psi_o$:

$$e_o = -\text{tg } \pi N_1 (\sin 2\psi - \sin 2\psi_o) (1 + \text{tg}^2 \pi N + \sin^2 \pi N_1 \cos^2 2\psi + \dots)$$

to quantities of the second order in N and N_1 . The correction factor may be neglected, provided $\text{tg}^2 \pi N + \sin^2 \pi N_1$ is negligible in comparison with 1. Then

$$e_o = -\text{tg } \pi N_1 (\sin 2\psi - \sin 2\psi_o) \quad (69)$$

In case *large ellipticities* are to be measured, the determination of the azimuth of the major axis of the ellipse becomes of importance, and the difficulty of determining it with the preceding arrangement renders the method valueless. For measuring large ellipticities, Mr. A. Q. Tool has devised an arrangement involving the measurement of the double rotation of compensator and analyzer, which is analogous to Stokes's method, and in fact may be considered as an application of the halfshade principle to Stokes's analyzer.

The analyzing nicol is replaced by a halfshade system of the Lippich type (split nicol, Lippich, or, for greater sensibility, a Brace sensitive strip), which will be designated simply as the "Lippich." The elliptic halfshade (which will be designated as before, simply "the halfshade"), instead of being fixed relative to the incident light, is fastened to the Lippich and rotates with it, i. e. in the previous notation, $\sphericalangle(2,3)$ is constant. The divid-

ing edges of the Lippich and the halfshade cross each other at an angle (preferably 90°), dividing the field into four parts. They should be placed as nearly in the same plane as possible, in order that both may be at the same time in focus in the observing telescope. A match of intensity of the two halves of the Lippich will be called a "Lippich match"; of the two halves of the halfshade, a "halfshade match." A complete match is both a Lippich and a halfshade match. The setting is always made for a complete match.

Expressed in terms of the light which emerges from the compensator (P_o, Q_1, K_1, S_1), the condition for a halfshade match is from (14):

$$\begin{aligned}
 & -Q_1 \sin 2(1,2) \sin 2(2,3) (\cos 2\pi N_2 - \cos 2\pi N'_2) \\
 & + K_1 \cos 2(1,2) \sin 2(2,3) (\cos 2\pi N_2 - \cos 2\pi N'_2) \\
 & + S_1 \dots \dots \sin 2(2,3) (\sin 2\pi N_2 - \sin 2\pi N'_2) = 0
 \end{aligned}$$

Expanding in terms of N and ΔN and simplifying, this reduces to

$$[Q_1 \sin 2(1,2) - K_1 \cos 2(1,2)] \operatorname{tg} 2\pi N + S_1 = 0$$

Similarly the condition for a Lippich match is from (14):

$$\begin{aligned}
 & \kappa P_o + Q_1 \left| \begin{array}{l} + \cos 2(1,2) \dots \dots [\cos 2(2,3) - (1-\kappa) \cos 2(2,3')] \\ - \sin 2(1,2) \cos 2\pi N_2 [\sin 2(2,3) - (1-\kappa) \sin 2(2,3')] \end{array} \right| \\
 & + K_1 \left| \begin{array}{l} + \sin 2(1,2) \dots \dots [\cos 2(2,3) - (1-\kappa) \cos 2(2,3')] \\ + \cos 2(1,2) \cos 2\pi N_2 [\sin 2(2,3) - (1-\kappa) \sin 2(2,3')] \end{array} \right| \\
 & + S_1 \sin 2\pi N_2 [\sin 2(2,3) - (1-\kappa) \sin 2(2,3')] = 0
 \end{aligned}$$

Expanding in terms of N and ΔN and introducing the condition of a simultaneous halfshade match, the terms containing $\sin 2\pi \Delta N$ become zero, and it reduces to:

$$\begin{aligned} & \kappa P_0 + Q_1 \left| \begin{array}{l} + \cos 2(1,2) [\cos 2(2,3) - (1-\kappa) \cos 2(2,3')] \\ - \sin 2(1,2) \cos 2\pi N \cos 2\pi \Delta N [\sin 2(2,3) \\ - (1-\kappa) \sin 2(2,3')] \end{array} \right| \\ & + K_1 \left| \begin{array}{l} + \sin 2(1,2) [\cos 2(2,3) - (1-\kappa) \cos 2(2,3')] \\ + \cos 2(1,2) \cos 2\pi N \cos 2\pi \Delta N [\sin 2(2,3) \\ - (1-\kappa) \sin 2(2,3')] \end{array} \right| \\ & + S_1 \sin 2\pi N \cos 2\pi \Delta N [\sin 2(2,3) - (1-\kappa) \sin 2(2,3')] = 0 \end{aligned}$$

Substituting for Q_1 , K_1 and S_1 their values, $Q_1 = P_0 \frac{1-e_1^2}{1+e_1^2} \cos 2\theta_1$, $K_1 = P_0 \frac{1-e_1^2}{1+e_1^2} \sin 2\theta_1$ and $S_1 = P_0 \frac{2e_1}{1+e_1^2}$, the equations become— for a halfshade match:

$$\frac{2e_1}{1-e_1^2} + \sin 2(1,2-\theta_1) \operatorname{tg} 2\pi N = 0; \quad (70)$$

for a Lippich match:

$$\begin{aligned} & \kappa + \frac{1-e_1^2}{1+e_1^2} \left| \begin{array}{l} + \cos 2(1,2-\theta_1) [\cos 2(2,3) - (1-\kappa) \cos 2(2,3')] \\ - \sin 2(1,2-\theta_1) \cos 2\pi N \cos 2\pi \Delta N [\sin 2(2,3) \\ - (1-\kappa) \sin 2(2,3')] \end{array} \right| \\ & + \frac{2e_1}{1+e_1^2} \sin 2\pi N \cos 2\pi \Delta N [\sin 2(2,3) - (1-\kappa) \sin 2(2,3')] = 0 \end{aligned} \quad (71)$$

In these equations there occur only two variables, e_1 and $\chi(1,2-\theta_1)$, the rest being constants depending on the rigid halfshade system. There is then a single pair of values of e_1 and $\chi(1,2-\theta_1)$ for which a complete match exists. Letting this value of $e_1 = \operatorname{tg} \eta$, and the corresponding value of $\chi(1,2-\theta_1) = a$, the analyzing system is characterized by η and a , which are constants of the system and satisfy the equations:

$$\begin{aligned} & \operatorname{tg} 2\eta + \sin 2a \operatorname{tg} 2\pi N = 0 \\ & \kappa \sec 2\eta + \cos 2a [\cos 2(2,3) - (1-\kappa) \cos 2(2,3')] \\ & - \sin 2a \frac{\cos 2\pi \Delta N}{\cos 2\pi N} [\sin 2(2,3) - (1-\kappa) \sin 2(2,3')] = 0 \end{aligned} \quad (72)$$

Introducing Stokes's notation: $\chi(0, 1) = -R$, $\chi(90^\circ - \theta_1) = -r$,

$$-r = 90^\circ + a - \chi(1, 2),$$

i.e. any change in $\chi(1, 2)$ causes an equal change in r , so that r measures the rotation of the analyzing system.

If the initial light be referred as before to its major axis:

$$\begin{aligned} \frac{2e_1}{1-e_1^2} \operatorname{tg} 2\eta &= \frac{S_1}{Q_1 \cos 2\theta_1 + K_1 \sin 2\theta_1} \\ &= \frac{S_1}{Q_1 \cos 2r + K_1 \sin 2r} \end{aligned}$$

or

$$\operatorname{tg} 2\eta = \frac{-Q_o \sin 2R \sin 2\pi N_1 + S_o \cos 2\pi N_1}{Q_o \cos 2R \cos 2r + Q_o \sin 2R \sin 2r \cos 2\pi N_1 + S_o \sin 2r \sin 2\pi N_1}$$

which gives as the equation for the halfshade match:

$$\begin{aligned} &+ \cos 2R \cos 2r \operatorname{tg} 2\eta \\ &+ \sin 2R \sin 2r \operatorname{tg} 2\eta \cos 2\pi N_1 \\ &- \sin 2R \sin 2\pi N_1 \\ &+ \frac{2e_o}{1-e_o^2} \left| \frac{+ \sin 2r \operatorname{tg} 2\eta \sin 2\pi N_1}{+ \cos 2\pi N_1} \right| = 0 \end{aligned}$$

For the Lippich match:

$$\begin{aligned} \operatorname{tg} 2r &= \operatorname{tg} 2\theta_1 = \frac{K_1}{Q_1} \\ &= \frac{Q_o \sin 2R \cos 2\pi N_1 + S_o \sin 2\pi N_1}{Q_o \cos 2R}; \end{aligned}$$

or

$$\begin{aligned} &+ \cos 2R \sin 2r \\ &- \sin 2R \cos 2r \cos 2\pi N_1 \\ &- \frac{2e_o}{1-e_o^2} \cos 2r \sin 2\pi N_1 = 0 \end{aligned}$$

If R and r are a solution of these equations, then $R' = \frac{\pi}{2} - R$, and $r' = \frac{\pi}{2} - r$ form another solution. Letting $c = R' - R = \frac{\pi}{2} - 2R$, and $n = r' - r = \frac{\pi}{2} - 2r$, the equations become:

$$\begin{aligned}
 & + \sin c \sin n \operatorname{tg} 2\eta \\
 & + \cos c \cos n \operatorname{tg} 2\eta \cos 2\pi N_1 \\
 & - \cos c \sin 2\pi N_1 \\
 & + \frac{2e_o}{1-e_o^2} \left| \frac{+\cos n \sin 2\pi N_1 \operatorname{tg} 2\eta}{+\cos 2\pi N_1} \right| = 0
 \end{aligned} \tag{73}$$

and

$$\begin{aligned}
 & + \sin c \cos n \\
 & - \cos c \sin n \cos 2\pi N_1 \\
 & - \frac{2e_o}{1-e_o^2} \sin n \sin 2\pi N_1 = 0
 \end{aligned} \tag{74}$$

Care must be taken, as in Stokes's analyzer, to insure that R' and R are complementary to the azimuth of the major axis of the incident light, since otherwise the sign of e_o will be incorrect.

By starting with plane polarized light the constants of the analyzing system (η) and compensator (N_1) can be measured. Since the incident light is plane polarized, $e_o = 0$ and (73) and (74) reduce to:

$$\begin{aligned}
 & + \sin c \sin n \operatorname{tg} 2\eta \\
 & + \cos c \cos n \operatorname{tg} 2\eta \cos 2\pi N_1 \\
 & - \cos c \sin 2\pi N_1 = 0
 \end{aligned}$$

and

$$\sin c \cos n - \cos c \sin n \cos 2\pi N_1 = 0$$

from which

$$\cos 2\pi N_1 = \frac{\operatorname{tg} c}{\operatorname{tg} n} \quad \text{or} \quad \operatorname{tg} \pi N_1 = \sqrt{\frac{\sin(n-c)}{\sin(n+c)}} \tag{75}$$

Also

$$\begin{aligned}
 \operatorname{tg} 2\eta &= \frac{\cos c \sin 2\pi N_1}{\sin c \sin n + \cos c \cos n \frac{\operatorname{tg} c}{\operatorname{tg} n}} \\
 &= \frac{\sin n \sin 2\pi N_1}{\operatorname{tg} c}
 \end{aligned}$$

or

$$\operatorname{tg} 2\eta = \frac{\sqrt{\sin(n+c) \sin(n-c)}}{\sin c} = \sqrt{\frac{\sin^2 n - \sin^2 c}{\sin^2 c}} \tag{76}$$

The signs of both $\operatorname{tg} 2\eta$ and $\sin 2\pi N_1$ are left undetermined by these equations, but both are known as soon as one is known.

Returning to equations (73) and (74) where $e_c \neq 0$, let $\frac{2e_c}{1-e_c^2} = t$, and arrange according to $\cos c$ and $\sin c$:

$$\left| \begin{array}{l} -\cos n \cos 2\pi N_1 \\ +\cot 2\eta \sin 2\pi N_1 \end{array} \right| \cos c - \sin n \sin c - t \left| \begin{array}{l} +\cos n \sin 2\pi N_1 \\ +\cot 2\eta \cos 2\pi N_1 \end{array} \right| = 0$$

and

$$-\sin n \cos 2\pi N_1 \cos c + \cos n \sin c - t \sin n \sin 2\pi N_1 = 0$$

Solving for t in the second of these equations:

$$t = \frac{-\sin n \cos 2\pi N_1 \cos c + \cos n \sin c}{\sin n \sin 2\pi N_1} \quad (77)$$

Substituting in the first:

$$\left| \begin{array}{l} -\cos n \cos 2\pi N_1 \\ +\cot 2\eta \sin 2\pi N_1 \end{array} \right| \cos c - \sin n \sin c + \frac{\sin n \cos 2\pi N_1 \cos c - \cos n \sin c}{\sin n \sin 2\pi N_1} \left| \begin{array}{l} +\cos n \sin 2\pi N_1 \\ +\cot 2\eta \cos 2\pi N_1 \end{array} \right| = 0$$

Clearing of fractions, expanding and collecting terms:

$$\begin{aligned} & -\cos c \sin n \\ & + \sin c \sin 2\pi N_1 \operatorname{tg} 2\eta \\ & + \sin c \cos n \cos 2\pi N_1 = 0 \end{aligned}$$

Substituting $\sin 2\pi N_1 = \frac{2 \operatorname{tg} \pi N_1}{1 + \operatorname{tg}^2 \pi N_1}$, $\cos 2\pi N_1 = \frac{1 - \operatorname{tg}^2 \pi N_1}{1 + \operatorname{tg}^2 \pi N_1}$, clearing of fractions, and collecting terms:

$$\begin{aligned} & -\sin(c+n) \operatorname{tg}^2 \pi N_1 \\ & + 2 \sin c \operatorname{tg} 2\eta \operatorname{tg} \pi N_1 \\ & + \sin(c-n) = 0 \end{aligned}$$

Solving for $\text{tg } \pi N_1$:

$$\text{tg } \pi N_1 = \frac{\sin c \text{tg } 2\eta \pm \sqrt{\sin^2 c \text{tg}^2 2\eta + \sin(c+n) \sin(c-n)}}{\sin(c+n)}$$

Letting

$$a = \frac{\sin c}{\sqrt{\sin(c+n) \sin(c-n)}} = \frac{\sin c}{\sqrt{\sin^2 c - \sin^2 n}}$$

where the square root is given its positive value:

$$\text{tg } \pi N_1 = \sqrt{\frac{\sin(c-n)}{\sin(c+n)}} (a \text{tg } 2\eta - \sqrt{1 + a^2 \text{tg}^2 2\eta}) \quad (78)$$

The square root $\sqrt{1 + a^2 \text{tg}^2 2\eta}$ must also be given its positive value. If η is small and the ellipticity of the incident light is also not too small this may be expanded in a series:

$$\text{tg } \pi N_1 = \sqrt{\frac{\sin(c-n)}{\sin(c+n)}} (1 - a \text{tg } 2\eta + \frac{1}{2} a^2 \text{tg}^2 2\eta - \frac{1}{8} a^4 \text{tg}^4 2\eta + \dots) \quad (79)$$

If the ellipticity of the incident light is small the coefficient a becomes large, and for the value $t = \text{tg } 2\eta$ is infinite. For these values $\text{tg } \pi N_1$ is given by the series:

$$\text{tg } \pi N_1 = \frac{\sin(c-n)}{2 \sin c \text{tg } 2\eta} (1 - \frac{1}{4 a^2 \text{tg}^2 2\eta} + \frac{1}{8 a^4 \text{tg}^4 2\eta} + \dots) \quad (80)$$

In the equation (77), substitute,

$$\sin 2\pi N_1 = \frac{2 \text{tg } \pi N_1}{1 + \text{tg}^2 \pi N_1}$$

and

$$\cos 2\pi N_1 = \frac{1 - \text{tg}^2 \pi N_1}{1 + \text{tg}^2 \pi N_1}$$

Then

$$t = \frac{-\cos c \sin n (1 - \text{tg}^2 \pi N_1) + \sin c \cos n (1 + \text{tg}^2 \pi N_1)}{2 \sin n \text{tg } \pi N_1}$$

$$= \frac{\sin(c-n) + \sin(c+n) \text{tg}^2 \pi N_1}{2 \sin n \text{tg } \pi N_1}$$

Substituting

$$\sin(c+n) \operatorname{tg}^2 \pi N_1 = 2 \sin c \operatorname{tg} 2 \eta \operatorname{tg} \pi N_1 + \sin(c-n)$$

$$t = \frac{\sin(c-n)}{\sin n \operatorname{tg} \pi N_1} + \frac{\sin c}{\sin n} \operatorname{tg} 2 \eta$$

and again substituting the value of $\operatorname{tg} \pi N_1$ found above:

$$t = \frac{\sin c}{\sin n} \left[\operatorname{tg} 2 \eta + \frac{1}{a(a \operatorname{tg} 2 \eta - \sqrt{1 + a^2 \operatorname{tg}^2 2 \eta})} \right]$$

$$= \frac{1 \sin(c-n) \sin(c+n)}{\sin n} \left[a \operatorname{tg} 2 \eta + \frac{1}{a \operatorname{tg} 2 \eta - 1 \sqrt{1 + a^2 \operatorname{tg}^2 2 \eta}} \right] \quad (81)$$

This in turn may be expanded in a series:

$$t = \frac{1 \sin(c-n) \sin(c+n)}{\sin n} (1 + 2a \operatorname{tg} 2 \eta + \frac{1}{2} a^2 \operatorname{tg}^2 2 \eta - \frac{1}{8} a^4 \operatorname{tg}^4 2 \eta + \dots)$$

$$(82)$$

and for small values of e_0 :

$$t = \frac{\sin c}{\sin n} \operatorname{tg} 2 \eta \left[1 + \frac{1}{2 a^2 \operatorname{tg}^2 2 \eta} - \frac{1}{8 a^4 \operatorname{tg}^4 2 \eta} + \dots \right] \quad (83)$$

In general the series in equations (79), (80), (82) and (83) are rapidly convergent and it is usually not necessary to consider terms beyond the first order in $\operatorname{tg} 2 \eta$. If the halfshade is balanced, $\operatorname{tg} 2 \eta = 0$, and the equations reduce to those for Stokes's analyzer.

If halfshade and compensator have both been calibrated, it is, as in Stokes's analyzer, not necessary to take both compensator and nicol readings, since either one alone is sufficient to determine t .

Arranging equations (73) and (74) according to $\sin n$ and $\cos n$

$$\begin{vmatrix} -\cos c \cos 2 \pi N_1 & -\cos c \sin 2 \pi N_1 \\ -t \sin 2 \pi N_1 & \cos n - \sin c \sin n = \cot 2 \eta \end{vmatrix} + t \cos 2 \pi N_1$$

and

$$\sin c \cos n + \begin{vmatrix} -\cos c \cos 2 \pi N_1 \\ -t \sin 2 \pi N_1 \end{vmatrix} \sin n = 0$$

These are of the form:

$$a \cos n - \beta \sin n = \gamma$$

$$\beta \cos n + a \sin n = 0$$

Squaring both and adding, $a^2 + \beta^2 = \gamma^2$, which is an equation independent of n . Substituting values for a , β and γ , and arranging according to powers of t :

$$\begin{aligned} & t^2 (1 - \sin^2 2\pi N_1 \sec^2 2\eta) \\ & - 2t \cos c \sin 2\pi N_1 \cos 2\pi N_1 \sec^2 2\eta \\ & + [1 - (1 - \cos^2 c \sin^2 2\pi N_1) \sec^2 2\eta] = 0 \end{aligned}$$

Solving for t :

$$t = \frac{\cos c \sin 2\pi N_1 \cos 2\pi N_1 \sec^2 2\eta \pm \text{tg } 2\eta \sqrt{1 - \sin^2 2\pi N_1 \sec^2 2\eta \sin^2 c}}{1 - \sin^2 2\pi N_1 \sec^2 2\eta} \quad (84)$$

which is of the form: $t = k_1 \cos c + k_2 \sqrt{1 - k_3 \sin^2 c}$

where k_1 , k_2 and k_3 are constants depending only on N_1 and η . If η is small the equation approaches the equation for Stokes's analyzer,

$$t = \text{tg } 2\pi N_1 \cos c$$

As $2\pi N_1$ approaches $\frac{\pi}{2}$, this approaches the form, $t = \infty \cdot 0$, so that the equation becomes illusory for compensators which are approximately quarter-wave plates and are required for measuring large ellipticities. The value of t varies less with changes of c , the more nearly $t = \text{tg } 2\pi N_1$ which gives the condition for greatest accuracy in determining t .

When $2\pi N_1$ is near $\frac{\pi}{2}$, a usable equation may be obtained by eliminating c instead of n . Arranged according to $\cos c$ and $\sin c$, the equations (73) and (74) are of the form:

$$a \cos c + \beta \sin c + \gamma = 0$$

$$\delta \cos c + \epsilon \sin c + \zeta = 0$$

Solving for $\cos c$ and $\sin c$, squaring, adding and clearing of fractions:

$$\left| \begin{array}{cc} \gamma & \beta \\ \zeta & \epsilon \end{array} \right|^2 + \left| \begin{array}{cc} a & \gamma \\ \delta & \zeta \end{array} \right|^2 - \left| \begin{array}{cc} a & \beta \\ \delta & \epsilon \end{array} \right|^2 = 0$$

an equation which is independent of c . Substituting values, simplifying and collecting terms:

$$\begin{aligned} & [1 - (\cos 2\eta \sin 2\pi N_1 \cos n - \sin 2\eta \cos 2\pi N_1)^2] t^2 \\ & - (\cos 2\eta \sin 2\pi N_1 \cos n - \sin 2\eta \cos 2\pi N_1)^2 = 0 \end{aligned}$$

which gives:

$$t = \frac{a - b \cos n}{\sqrt{1 - (a - b \cos n)^2}} \tag{85}$$

where $a = \sin 2\eta \cos 2\pi N_1$, and $b = \cos 2\eta \sin 2\pi N_1$. Letting $a - b \cos n = \sin \chi$, then:

$$t = \text{tg } \chi \quad \text{and} \quad e_o = \text{tg } \frac{1}{2} \chi \tag{86}$$

These equations are still usable when $2\pi N_1 = \frac{\pi}{2}$.

This method evidently has all the experimental advantages of Stokes's analyzer, with the added sensibility of a halfshade system. It has the disadvantage of slightly more complicated formulae for unbalanced halfshades, but for balanced halfshades, as has been shown, the formulae are the same.

10. SENSIBILITY OF HALFSHADE SYSTEMS

Let the intensity of the light emerging from one side of the halfshade system be I , and from the other I' . Let one-half the difference in intensity between the two halves, $\frac{1}{2}(I - I') = \Delta I$, and the average intensity of the two halves, $\frac{1}{2}(I + I') = I_m$. Then the condition for an observed match is:

$$\frac{\Delta I}{I_m} \neq \frac{1}{2} f(I_m, \alpha, \beta, \gamma, \dots) \tag{87}$$

where $f(I_m, \alpha, \beta, \gamma, \dots)$ is the photometric function. $\alpha, \beta, \gamma, \dots$ are constants depending on the sharpness of the dividing line between the two halves of the field, the parallelism and purity of the

(assumed monochromatic) light and other incidental factors. If a perfect match were obtained ΔI would equal zero.

If the light incident on the system is elliptically polarized, ΔI and I_m will in general be functions of its initial ellipticity e_o and its initial azimuth θ_o .

Starting with a perfect match,

$$\frac{\Delta I}{I_m} = 0,$$

and varying e_o within the limits of an observed match, equation (87) becomes:

$$\frac{\partial}{\partial e_o} \left(\frac{\Delta I}{I_m} \right) \delta e_o \approx \frac{1}{2} f(I_m, \alpha, \beta, \gamma, \dots) \quad (88)$$

Again, varying the azimuth θ_o within the limits of an observed match:

$$\frac{\partial}{\partial \theta_o} \left(\frac{\Delta I}{I_m} \right) \delta \theta_o \approx \frac{1}{2} f(I_m, \alpha, \beta, \gamma, \dots) \quad (89)$$

The maximum possible variations or errors of e_o and θ_o compatible with an observed match are then:

$$\delta e_o = \frac{1}{2} \frac{f(I_m, \alpha, \beta, \gamma, \dots)}{\frac{\partial}{\partial e_o} \left(\frac{\Delta I}{I_m} \right)} \quad (90)$$

and:

$$\delta \theta_o = \frac{1}{2} \frac{f(I_m, \alpha, \beta, \gamma, \dots)}{\frac{\partial}{\partial \theta_o} \left(\frac{\Delta I}{I_m} \right)} \quad (91)$$

Although the form of $f(I_m, \alpha, \beta, \gamma, \dots)$ is not definitely known, certain general conclusions about the variation of sensibility with varying experimental conditions may be deduced for special halfshade systems.

Type A.

Lippich Half Nicol.

Brace Sensitive Strip, etc.

Here $I = I_1$ and $I' = (1 - \kappa)I_1$. Then from (11)

$$\frac{\Delta I}{I_m} = \frac{\kappa P_1 + Q_1 - (1 - \kappa) Q'_1}{(2 - \kappa) P_1 + Q_1 + (1 - \kappa) Q'_1}$$

$$= \frac{\left[\begin{array}{l} \kappa P_o \\ + Q_o [\cos 2(\theta_o, I) - (1 - \kappa) \cos 2(\theta_o, I')] \\ + K_o [\sin 2(\theta_o, I) - (1 - \kappa) \sin 2(\theta_o, I')] \end{array} \right]}{\left[\begin{array}{l} (2 - \kappa) P_o \\ + Q_o [\cos 2(\theta_o, I) + (1 - \kappa) \cos 2(\theta_o, I')] \\ + K_o [\sin 2(\theta_o, I) + (1 - \kappa) \sin 2(\theta_o, I')] \end{array} \right]}$$

If the initial light is plane polarized:

$$Q_o = P_o \cos 2\theta_o$$

$$K_o = P_o \sin 2\theta_o$$

Substituting these values and simplifying:

$$\frac{\Delta I}{I_m} = \frac{\kappa + \cos 2(\theta_o, I - \theta_o) - (1 - \kappa) \cos 2(\theta_o, I' - \theta_o)}{(2 - \kappa) + \cos 2(\theta_o, I - \theta_o) + (1 - \kappa) \cos 2(\theta_o, I' - \theta_o)}$$

Differentiating with respect to θ_o and introducing the condition for a perfect match:

$$\kappa + \cos 2(\theta_o, I - \theta_o) - (1 - \kappa) \cos 2(\theta_o, I' - \theta_o) = 0$$

$$\frac{\partial}{\partial \theta_o} \left[\frac{\Delta I}{I_m} \right] = \frac{\sin 2(\theta_o, I - \theta_o) - (1 - \kappa) \sin 2(\theta_o, I' - \theta_o)}{1 + \cos 2(\theta_o, I - \theta_o)}$$

and,

$$\delta \theta_o = \frac{1}{2} \frac{1 + \cos 2(\theta_o, I - \theta_o)}{\sin 2(\theta_o, I - \theta_o) - (1 - \kappa) \sin 2(\theta_o, I' - \theta_o)} f(I_m, \alpha, \beta, \gamma, \dots) \quad (92)$$

But

$$1 + \cos 2(\theta_o, I - \theta_o) = \frac{I_m}{P_o}$$

From which:

$$\sin 2(\theta_o, I - \theta_o) = \frac{1}{P_o} \sqrt{I_m (2P_o - I_m)}$$

and,

$$(1 - \kappa) \sin 2(\theta_o, I' - \theta_o) = \frac{1}{P_o} \sqrt{I_m [2P_o(1 - \kappa) - I_m]}$$

Then

$$\delta \theta_o = \frac{1}{2} \frac{I_m}{\sqrt{I_m (2P_o - I_m) + 1} \sqrt{I_m [2P_o(1 - \kappa) - I_m]}} f(I_m, \alpha, \beta, \gamma, \dots) \quad (93)$$

or approximately since κ is small and I_m small compared with $2P_o$

$$\delta\theta_o = \frac{I}{4} \sqrt{\frac{I_m}{2P_o}} f(I_m, \alpha, \beta, \gamma, \dots) \tag{94}$$

Type B

Bravais Biplate.

Brace Elliptic Halfshade.

Laurent Saccharimeter Halfshade.

For these $I=I_2$ and $I'=I'_2$, the difference between the two halves consisting of the difference between the orders N_1 and N'_1 of the two halves of the halfshade. Then from (14)

$$\frac{\Delta I}{I_m} = \frac{\begin{array}{l} -Q_o \sin 2(0, 1) \sin 2(1, 2) (\cos 2\pi N_1 - \cos 2\pi N'_1) \\ + K_o \cos 2(0, 1) \sin 2(1, 2) (\cos 2\pi N_1 - \cos 2\pi N'_1) \\ + S_o \dots \dots \sin 2(1, 2) (\sin 2\pi N_1 - \sin 2\pi N'_1) \end{array}}{\begin{array}{l} + 2P_o \\ + 2Q_o \cos 2(0, 1) \cos 2(1, 2) \\ + 2K_o \sin 2(0, 1) \cos 2(1, 2) \\ - Q_o \sin 2(0, 1) \sin 2(1, 2) (\cos 2\pi N_1 + \cos 2\pi N'_1) \\ + K_o \cos 2(0, 1) \sin 2(1, 2) (\cos 2\pi N_1 + \cos 2\pi N'_1) \\ + S_o \dots \dots \sin 2(1, 2) (\sin 2\pi N_1 + \sin 2\pi N'_1) \end{array}}$$

Substituting $\frac{1}{2}(N_1 + N'_1) = N$, and $\frac{1}{2}(N_1 - N'_1) = \Delta N$:

$$\frac{\Delta I}{I_m} = \frac{\begin{array}{l} + \left| \begin{array}{l} + Q_o \sin 2(0, 1) \\ - K_o \cos 2(0, 1) \end{array} \right| \sin 2\pi N \\ + S_o \cos 2\pi N \end{array} \left| \sin 2(1, 2) \sin 2\pi \Delta N \right.}{\begin{array}{l} + P_o \\ + Q_o \cos 2(0, 1) \cos 2(1, 2) \\ + K_o \sin 2(0, 1) \cos 2(1, 2) \\ + \left| \begin{array}{l} + Q_o \sin 2(0, 1) \\ - K_o \cos 2(0, 1) \end{array} \right| \cos 2\pi N \\ + S_o \sin 2\pi N \end{array} \left| \sin 2(1, 2) \cos 2\pi \Delta N \right.}$$

Substituting

$$\begin{aligned}
 P_o &= P \\
 Q_o &= P_o \frac{1 - e_o^2}{1 + e_o^2} \cos 2\theta_o \\
 K_o &= P_o \frac{1 - e_o^2}{1 + e_o^2} \sin 2\theta_o \\
 S_o &= P_o \frac{2e_o}{1 + e_o^2}
 \end{aligned}
 \tag{17}$$

There results:

$$\frac{\Delta I}{I_m} = \frac{\left| \begin{array}{l} \frac{1 - e_o^2}{1 + e_o^2} \sin 2(0, 1 - \theta_o) \sin 2\pi N \\ + \frac{2e_o}{1 + e_o^2} \cos 2\pi N \end{array} \right| \sin 2(1, 2) \sin 2\pi \Delta N}{\left| \begin{array}{l} 1 + \frac{1 - e_o^2}{1 + e_o^2} \cos 2(0, 1 - \theta_o) \cos 2(1, 2) \\ - \left| \begin{array}{l} \frac{1 - e_o^2}{1 + e_o^2} \sin 2(0, 1 - \theta_o) \cos 2\pi N \\ - \frac{2e_o}{1 + e_o^2} \sin 2\pi N \end{array} \right| \sin 2(1, 2) \cos 2\pi \Delta N \end{array} \right|}
 \tag{95}$$

Bravais Biplate and Brace Elliptic Halfshade.—In discussing sensibility to changes of ellipticity of the incident light, no needful generality is lost by considering the halfshade to be a balanced halfshade ($N=0$) since the unbalanced portion of the halfshade may, if large enough to be of importance, be considered as a part of the compensating system. Introducing this condition, $N=0$.

$$\frac{\Delta I}{I_m} = \frac{\frac{2e_o}{1 + e_o^2} \sin 2(1, 2) \sin 2\pi \Delta N}{\left| \begin{array}{l} 1 + \frac{1 - e_o^2}{1 + e_o^2} \cos 2(0, 2 - \theta_o) \\ + \frac{1 - e_o^2}{1 + e_o^2} \sin 2(0, 1 - \theta_o) \sin 2(1, 2) (1 - \cos 2\pi \Delta N) \end{array} \right|}$$

Differentiating with respect to e_o , and introducing the condition for a perfect match, $e_o=0$:

$$\frac{\partial}{\partial e_o} \left[\frac{\Delta I}{I_m} \right] = \frac{2 \sin 2(1, 2) \sin 2\pi \Delta N}{1 + \cos 2(0, 2 - \theta_o) + 2 \sin 2(0, 1 - \theta_o) \sin 2(1, 2) \sin^2 \pi \Delta N}$$

Then the maximum possible error in e_o , compatible with an observed match, is:

$$\begin{aligned} \delta e_o &= \frac{1}{4} f(I_m, \alpha, \beta, \gamma, \dots) \frac{\left| \begin{array}{l} 1 + \cos 2(0, 2 - \theta_o) \\ + 2 \sin 2(0, 2 - 1, 2 - \theta_o) \sin 2(1, 2) \sin^2 \pi \Delta N \end{array} \right|}{\sin 2(1, 2) \sin 2\pi \Delta N} \\ &= \frac{1}{4} f(I_m, \alpha, \beta, \gamma, \dots) \frac{\left| \begin{array}{l} 1 + [1 - 2 \sin^2 2(1, 2) \sin^2 \pi \Delta N] \cos 2(0, 2 - \theta_o) \\ + \sin 4(1, 2) \sin^2 \pi \Delta N \sin 2(0, 2 - \theta_o) \end{array} \right|}{\sin 2(1, 2) \sin 2\pi \Delta N} \end{aligned} \quad (96)$$

The numerator of this expression is $\frac{I_m}{P_o}$. Although the form of $f(I_m, \alpha, \beta, \gamma, \dots)$ is not definitely known, it is known that for all useful values of I_m , the expression $I_m f(I_m, \alpha, \beta, \gamma, \dots)$ decreases with decreasing I_m . If, therefore, the numerator of the expression for δe_o be decreased without altering the denominator, δe_o is decreased and the sensibility increased. This can be done by varying $\chi(0, 2 - \theta_o)$. Differentiating the numerator with respect to $\chi(0, 2 - \theta_o)$ and equating to zero.

$$\begin{aligned} -[1 - 2 \sin^2 2(1, 2) \sin^2 \pi \Delta N] \sin 2(0, 2 - \theta_o) \\ + \sin 4(1, 2) \sin^2 \pi \Delta N \cos 2(0, 2 - \theta_o) = 0 \end{aligned}$$

Solving for $\text{tg } 2(0, 2 - \theta_o)$:

$$\text{tg } 2(0, 2 - \theta_o) = \frac{\sin 4(1, 2) \sin^2 \pi \Delta N}{1 - 2 \sin^2 2(1, 2) \sin^2 \pi \Delta N}$$

from which

$$\sin 2(0, 2 - \theta_o) = \frac{\sin 4(1, 2) \sin^2 \pi \Delta N}{1 - \sin^2 2(1, 2) \sin^2 2\pi \Delta N} \quad (97)$$

and

$$\cos 2(\alpha, 2 - \theta_0) = \frac{1 - 2 \sin^2 2(1, 2) \sin^2 \pi \Delta N}{\sqrt{1 - \sin^2 2(1, 2) \sin^2 2 \pi \Delta N}} \quad (97)$$

These give a minimum of I_m for any constant value of $\sin 2(1, 2) \sin 2 \pi \Delta N$. The negative sign is used since the positive sign gives a maximum of I_m . Substituting these values in δe_0 and reducing:

$$\delta e_0 = \frac{1}{4} \frac{1 - \sqrt{1 - \sin^2 2(1, 2) \sin^2 2 \pi \Delta N}}{\sin 2(1, 2) \sin 2 \pi \Delta N} f(I_m, \alpha, \beta, \gamma, \dots) \quad (98)$$

This value of δe_0 can be written as a function of $I_m, \alpha, \beta, \gamma, \dots$ alone and independent of $\chi(1, 2)$ and the differential order of the halfshade, ΔN , for:

$$I_m = P_0 (1 - \sqrt{1 - \sin^2 2(1, 2) \sin^2 2 \pi \Delta N})$$

from which

$$\sin 2(1, 2) \sin 2 \pi \Delta N = \frac{1}{P_0} \sqrt{I_m (2P_0 - I_m)}$$

or

$$\delta e_0 = \frac{1}{4} \sqrt{\frac{I_m}{2P_0 - I_m}} f(I_m, \alpha, \beta, \gamma, \dots) \quad (99)$$

Or approximately, since I_m is small in comparison with $2P_0$:

$$\delta e_0 = \frac{1}{4} \sqrt{\frac{I_m}{2P_0}} f(I_m, \alpha, \beta, \gamma, \dots) \quad (100)$$

Therefore, the maximum attainable sensibility of a balanced elliptic halfshade of the type discussed is independent of the difference in order of its two halves (ΔN), provided that the difference is great enough to secure the requisite intensity.¹

Although the condition above discussed gives theoretically the greatest sensibility, it is more usual and in practice easier to make

¹The conclusion drawn by Zakrzewski (Zakrzewski, M. C., *Bull. Int. de l'Acad. des Sci. de Crac.*, pp. 1016-26, Nov., 1907) that a quarter-wave Bravais biplate ($\Delta N = \frac{1}{4}$) gives a maximum sensibility is apparently due to an invalid approximation.

$(0, 2 - \theta_0) = 90^\circ$, i.e. to set the analyzing nicol at right angles to the plane of polarization of the original light. This gives:

$$\delta e_0 = \frac{1}{2} \frac{\sin 2(1, 2) \sin^2 \pi \Delta N}{\sin 2 \pi \Delta N} f(I_m, \alpha, \beta, \gamma, \dots) \quad (101)$$

Since $\sin^2 2(1, 2) \sin^2 \pi \Delta N$ is always small in practice, the equation for maximum sensibility (98), neglecting higher powers, may be written:

$$\delta e_0 = \frac{1}{2} \frac{\sin 2(1, 2) (\sin^2 \pi \Delta N - \sin^4 \pi \Delta N)}{\sin 2 \pi \Delta N} f(I_m, \alpha, \beta, \gamma, \dots)$$

For low values of ΔN , $\sin^4 \pi \Delta N$ may be neglected in comparison with $\sin^2 \pi \Delta N$, and the sensibility in both cases is practically the same.

For large values of ΔN , however, as in the Bravais biplate, where $\Delta N = \frac{1}{4}$, the ratio of the two sensibilities may be as great as two to one.

Of the other factors, $\alpha, \beta, \gamma, \dots$ on which the sensibility depends, the sharpness of the dividing line, which is inherent in the halfshade, is of the greatest importance¹; and in this respect the Brace halfshade is far superior to the Bravais biplate. In joining the two halves of the Bravais biplate, it is difficult, if not impossible, to avoid considerable diffuse reflection with its consequent depolarizing action. In the Brace halfshade the thin edge of the mica is mounted in balsam of nearly the same index of refraction, so that this effect is reduced to a minimum, and the dividing edge is clear and sharp.

Laurent Saccharimeter Halfshade.—The sensibility to azimuth variations is of special interest when the incident light is plane polarized. Then $e_0 = 0$ and from (95)

$$\frac{\Delta I}{I_m} = \frac{\sin 2(0, 1 - \theta_0) \sin 2(1, 2) \sin 2 \pi N \sin 2 \pi \Delta N}{\left| \begin{array}{l} 1 + \cos 2(0, 1 - \theta_0) \cos 2(1, 2) \\ - \sin 2(0, 1 - \theta_0) \sin 2(1, 2) \cos 2 \pi N \cos 2 \pi \Delta N \end{array} \right|}$$

¹Lummer, O., and Brodhun, E. *Ztschr. f. Instk.*, vol. 9, pp. 41-50, 1889.

Differentiating with respect to θ_0 and introducing the condition for a perfect match, $\chi(0, 1 - \theta_0) = 0$, gives:

$$\frac{\partial}{\partial \theta_0} \left(\frac{\Delta I}{I_m} \right) = - \frac{2 \sin 2(I, 2) \sin 2\pi N \sin 2\pi \Delta N}{1 + \cos 2(I, 2)}$$

or

$$\delta \theta_0 = - \frac{1}{4} \frac{1 + \cos 2(I, 2)}{\sin 2(I, 2) \sin 2\pi N \sin 2\pi \Delta N} f(I_m, \alpha, \beta, \gamma, \dots) \quad (102)$$

This will be a minimum for constant I_m when $\sin 2\pi N \sin 2\pi \Delta N$ is a maximum, i.e. $N = \frac{1}{4}$ and $\Delta N = \frac{1}{4}$. This is the condition in the Laurent saccharimeter halfshade. Then:

$$\delta \theta_0 = - \frac{1}{4} \frac{1 + \cos 2(I, 2)}{\sin 2(I, 2)} f(I_m, \alpha, \beta, \gamma, \dots) \quad (103)$$

Substituting

$$\frac{I_m}{P_0} = 1 + \cos 2(I, 2)$$

$$\delta \theta_0 = \frac{1}{4} \sqrt{\frac{I_m}{2P_0 - I_m}} f(I_m, \alpha, \beta, \gamma, \dots) \quad (104)$$

or approximately

$$\delta \theta_0 = \frac{1}{4} \sqrt{\frac{I_m}{2P_0}} f(I_m, \alpha, \beta, \gamma, \dots) \quad (105)$$

A comparison of the formulae for the maximum sensibility of these three halfshades—balanced elliptic halfshade, Laurent saccharimeter halfshade, and Lippich halfnicol—is of interest:

$$\text{Lippich: } \delta \theta_0 = \frac{1}{4} \sqrt{\frac{I_m}{2P_0}} f(I_m, \alpha, \beta, \gamma, \dots) \quad (94)$$

$$\text{Laurent: } \delta \theta_0 = \frac{1}{4} \sqrt{\frac{I_m}{2P_0}} f(I_m, \alpha, \beta, \gamma, \dots) \quad (105)$$

$$\text{Elliptic: } \delta \theta_0 = \frac{1}{4} \sqrt{\frac{I_m}{2P_0}} f(I_m, \alpha, \beta, \gamma, \dots) \quad (100)$$

Whatever difference, then, exists between these sensibilities in practice arises from the constants, $\alpha, \beta, \gamma, \dots$, depending on the sharpness of the dividing line, the parallelism and homogeneity of the light, and other incidental factors. Since these factors have great influence on the value of $f(I_m, \alpha, \beta, \gamma, \dots)$

the formal equality of the sensibilities shown above can not be expected to be realized in practice. A careful comparison of the Lippich halfnicol with the Laurent saccharimeter halfshade, involving a partial discussion of the value of $f(I_m, \alpha, \beta, \gamma, \dots)$ has been made by F. Lippich.¹ The relative sensibilities of various systems actually realized in practice have been discussed by Brace.²

II. ERRORS IN THE USE OF A COMPENSATOR

Since elliptically polarized light is always measured by the use of a compensator, an estimate of the accuracy of its determination can only be made by a discussion of the errors involved in the use of a compensator. If light of ellipticity e_o and azimuth θ_o is changed by a compensator of order N_1 and azimuth ψ into light of ellipticity e_1 and azimuth θ_1 , the coefficients determining the errors in the determination of e_o and θ_o are the partial differential coefficients: $\frac{\partial e_o}{\partial e_1}, \frac{\partial e_o}{\partial \theta_1}, \frac{\partial e_o}{\partial \psi}, \frac{\partial e_o}{\partial N_1}$, and $\frac{\partial \theta_o}{\partial e_1}, \frac{\partial \theta_o}{\partial \theta_1}, \frac{\partial \theta_o}{\partial \psi}, \frac{\partial \theta_o}{\partial N_1}$. By means of these the accuracy of the determination of e_o and θ_o may be found if the errors $\delta e_1, \delta \theta_1, \delta \psi$, and δN_1 are known.

If all azimuths are referred to the same axes of reference, the second form of the general theorem is the more convenient. Then in equations (13) letting $\sphericalangle(0, 1) = \psi$:

$$\begin{aligned} P_o &= +P_1 \\ Q_o &= +Q_1(1 - 2\sin^2 2\psi \sin^2 \pi N_1) \\ &\quad + K_1 \sin 4\psi \sin^2 \pi N_1 \\ &\quad + S_1 \sin 2\psi \sin 2\pi N_1 \\ K_o &= +Q_1 \sin 4\psi \sin^2 \pi N_1 \\ &\quad + K_1(1 - 2\cos^2 2\psi \sin^2 \pi N_1) \\ &\quad - S_1 \cos 2\psi \sin 2\pi N_1 \\ S_o &= -Q_1 \sin 2\psi \sin 2\pi N_1 \\ &\quad + K_1 \cos 2\psi \sin 2\pi N_1 \\ &\quad + S_1 \dots \cos 2\pi N_1 \end{aligned}$$

¹Lippich, F. *Wien. Ber.*, vol. 99, p. 695, 1890; *Ztschr. f. Instk.*, vol. 12, pp. 333-42, 1892.

²Brace, D. B. *Phys. Rev.*, vol. 18, pp. 70-88, 1904.

then (22) :

$$\operatorname{tg} 2\theta_0 = \frac{K_0}{Q_0}$$

From which

$$\operatorname{tg} 2(\psi - \theta_0) = \frac{Q_0 \sin 2\psi - K_0 \cos 2\psi}{Q_0 \cos 2\psi + K_0 \sin 2\psi}$$

Also (24) :

$$\frac{2e_0}{1+e_0^2} = \frac{S_0}{P_0}$$

Substituting the values of Q_0 , K_0 and S_0 , in terms of Q_1 , K_1 and S_1 , replacing these in turn by $Q_1 = P_0 \frac{1-e_1^2}{1+e_1^2} \cos 2\theta_1$, $K_1 = P_0 \frac{1-e_1^2}{1+e_1^2} \sin 2\theta_1$ and $S_1 = P_0 \frac{2e_1}{1-e_1^2}$, and expressing e_1 and e_0 in terms of ω_1 and ω_0 , defined by the equations, $\operatorname{tg} \omega_1 = e_1$ and $\operatorname{tg} \omega_0 = e_0$, there results:

$$\operatorname{tg} 2(\psi - \theta_0) = \operatorname{tg} 2(\psi - \theta_1) \cos 2\pi N_1 + \sec 2(\psi - \theta_1) \operatorname{tg} 2\omega_1 \sin 2\pi N_1 \quad (106)$$

and

$$\sin 2\omega_0 = \sin 2\omega_1 \cos 2\pi N_1 - \sin 2(\psi - \theta_1) \cos 2\omega_1 \sin 2\pi N_1 \quad (107)$$

It is convenient in the differential coefficients, to replace functions of the angles $(\psi - \theta_0)$ and $(\psi - \theta_1)$ by their values in terms of ω_0 , ω_1 , and N_1 . These are given by the following equations. Defining for convenience the symmetrical function of ω_0 and ω_1 , $S(\omega_0, \omega_1)$ by

$$S(\omega_0, \omega_1) = \sqrt{\cos^2 2\omega_0 \cos^2 2\omega_1 - (\cos 2\pi N_1 - \sin 2\omega_0 \sin 2\omega_1)^2} \quad (108)$$

Then:

$$\begin{aligned} \sin 2(\psi - \theta_0) &= \frac{\sin 2\omega_1 - \sin 2\omega_0 \cos 2\pi N_1}{\cos 2\omega_0 \sin 2\pi N_1} \\ \cos 2(\psi - \theta_0) &= \frac{S(\omega_0, \omega_1)}{\cos 2\omega_0 \sin 2\pi N_1} \\ \operatorname{tg} 2(\psi - \theta_0) &= \frac{\sin 2\omega_1 - \sin 2\omega_0 \cos 2\pi N_1}{S(\omega_0, \omega_1)} \\ \sin 2(\psi - \theta_1) &= \frac{\sin 2\omega_1 \cos 2\pi N_1 - \sin 2\omega_0}{\cos 2\omega_1 \sin 2\pi N_1} \\ \cos 2(\psi - \theta_1) &= \frac{S(\omega_0, \omega_1)}{\cos 2\omega_1 \sin 2\pi N_1} \\ \operatorname{tg} 2(\psi - \theta_1) &= \frac{\sin 2\omega_1 \cos 2\pi N_1 - \sin 2\omega_0}{S(\omega_0, \omega_1)} \end{aligned} \quad (109)$$

Here it is to be noted that if $\cos 2(\psi - \theta_0) = 0$, then $s(\omega_0, \omega_1) = 0$ and $\cos 2(\psi - \theta_1) = 0$.

Differentiating the expressions for $\text{tg } 2(\psi - \theta_0)$ and $\sin 2\omega_0$, substituting values for the functions of $(\psi - \theta_0)$ and $(\psi - \theta_1)$ which appear in the coefficients and finally using the relations:

$$\frac{\partial e_0}{\partial \psi} = \frac{de_0}{d\omega_0} \frac{\partial \omega_0}{\partial \psi} = \sec^2 \omega_0 \frac{\partial \omega_0}{\partial \psi}$$

$$\frac{\partial \psi}{\partial e_1} = \frac{d\omega_1}{de_1} \frac{\partial \psi}{\partial \omega_1} = \cos^2 \omega_1 \frac{\partial \psi}{\partial \omega_1}$$

the following results are obtained:

$$\begin{aligned} \frac{\partial e_0}{\partial e_1} &= \sec^2 \omega_0 \sec 2\omega_0 \cos^2 \omega_1 \sec 2\omega_1 \cos 2\pi N_1 \\ &\quad - \sec^2 \omega_0 \text{tg } 2\omega_0 \cos^2 \omega_1 \text{tg } 2\omega_1 \\ -\frac{\partial e_0}{\partial \theta_1} &= \frac{\partial e_0}{\partial \psi} = -s(\omega_0, \omega_1) \sec^2 \omega_0 \sec 2\omega_0 \end{aligned} \quad (110)$$

$$\frac{\partial e_0}{\partial \pi N_1} = \sec^2 \omega_0 \text{tg } 2\omega_0 \cot 2\pi N_1 - \sec^2 \omega_0 \sec 2\omega_0 \sin 2\omega_1 \csc 2\pi N_1$$

and

$$\begin{aligned} -\frac{\partial \theta_0}{\partial e_1} &= s(\omega_0, \omega_1) \sec^2 2\omega_0 \cos^2 \omega_1 \sec 2\omega_1 \\ \frac{\partial \theta_0}{\partial \theta_1} &= 1 - \frac{\partial \theta_0}{\partial \psi} = \sec^2 2\omega_0 (\cos 2\pi N_1 - \sin 2\omega_0 \sin 2\omega_1) \\ -\frac{\partial \theta_0}{\partial \pi N_1} &= s(\omega_0, \omega_1) \text{tg } 2\omega_0 \sec 2\omega_0 \csc 2\pi N_1 \end{aligned} \quad (111)$$

There are two important special cases:

1. The compensator is placed at 45° to the incident light, and the compensated light is plane polarized: $\cos 2(\psi - \theta_0) = 0$ and $\omega_1 = 0$.

2. The compensated light is plane polarized, and the compensator is a quarter-wave plate: $\omega_1 = 0$ and $N_1 = \frac{1}{4}$.

In the first case $\cos 2(\psi - \theta_0) = 0$ and therefore $s(\omega_0, \omega_1) = 0$.

Then:

$$-\frac{\partial e_0}{\partial \theta_1} = \frac{\partial e_0}{\partial \psi} = -\frac{\partial \theta_0}{\partial e_1} = -\frac{\partial \theta_0}{\partial N_1} = 0 \quad (112)$$

That is: the errors in e_o due to errors in the determination of θ_1 and ψ , and the errors in θ_o due to errors in the determination of e_1 and N_1 are at the most of the second order and hence negligible.

If in addition $\omega_1=0$:

$$\frac{\partial e_o}{\partial e_1} = \frac{\partial e_o}{\partial \pi N_1} = \sec^2 \omega_o$$

and

$$\frac{\partial \theta_o}{\partial \theta_1} = 1 - \frac{\partial \theta_o}{\partial \psi} = \sec 2 \omega_o$$
(113)

In the second case, $\omega_1=0$ and therefore,

$$s(\omega_o, \omega_1) = \sqrt{\cos^2 2 \omega_o - \cos^2 2 \pi N_1}$$

where $|\sin 2 \omega_o| \not\geq |\sin 2 \pi N_1|$

Then:

$$\frac{\partial e_o}{\partial e_1} = \sec^2 \omega_o \sec 2 \omega_o \cos 2 \pi N_1$$

$$-\frac{\partial e_o}{\partial \theta_1} = \frac{\partial e_o}{\partial \psi} = -\sqrt{\cos^2 2 \omega_o - \cos^2 2 \pi N_1} \cdot \sec^2 \omega_o \sec 2 \omega_o$$
(114)

$$\frac{\partial e_o}{\partial \pi N_1} = \sec^2 \omega_o \operatorname{tg} 2 \omega_o \cot 2 \pi N_1$$

and

$$-\frac{\partial \theta_o}{\partial e_1} = \sqrt{\cos^2 2 \omega_o - \cos^2 2 \pi N_1} \cdot \sec^2 2 \omega_o$$

$$\frac{\partial \theta_o}{\partial \theta_1} = 1 - \frac{\partial \theta_o}{\partial \psi} = \sec^2 2 \omega_o \cos 2 \pi N_1$$
(115)

$$\frac{\partial \theta_o}{\partial \pi N_1} = \sqrt{\cos^2 2 \omega_o - \cos^2 2 \pi N_1} \cdot \operatorname{tg} 2 \omega_o \sec 2 \omega_o \operatorname{csc} 2 \pi N_1$$

If in addition, $N_1=1/4$, $\cos 2 \pi N_1 = \cot 2 \pi N_1 = 0$, $\operatorname{csc} 2 \pi N_1 = 1$, and $\sqrt{\cos^2 2 \omega_o - \cos^2 2 \pi N_1} = \cos 2 \omega_o$, then;

$$\frac{\partial e_o}{\partial e_1} = \frac{\partial e_o}{\partial N_1} = \frac{\partial \theta_o}{\partial \theta_1} = 1 - \frac{\partial \theta_o}{\partial \psi} = 0$$
(116)

That is: the errors in e_o due to errors in the determination of e_1 and N_1 and the errors in θ_o due to errors in the determination of θ_1 , are at the most of the second order, and hence negligible.

Also:

$$\frac{\partial e_o}{\partial \theta_1} = -\sec 2\omega_o, \quad \frac{\partial \theta_o}{\partial \pi N_1} = \text{tg } 2\omega_o. \quad (117)$$

The results in the two special cases are almost completely complementary. Placing them together for comparison:

1. $(\psi - \theta_o) = 45^\circ \quad \omega_1 = 0$

$$\frac{\partial e_o}{\partial \theta_1} = \frac{\partial e_o}{\partial \psi} = -\frac{\partial \theta_o}{\partial e_1} = \frac{\partial \theta_o}{\partial N_1} = 0 \quad (112)$$

$$\frac{\partial e_o}{\partial e_1} = \frac{\partial e_o}{\partial \pi N_1} = \sec^2 \omega_o \quad (113)$$

$$\frac{\partial \theta_o}{\partial \theta_1} = 1 - \frac{\partial \theta_o}{\partial \psi} = \sec 2\omega_o$$

2. $\omega_1 = 0 \quad N_1 = 1/4$

$$\frac{\partial e_o}{\partial e_1} = \frac{\partial e_o}{\partial N_1} = \frac{\partial \theta_o}{\partial \theta_1} = 1 - \frac{\partial \theta_o}{\partial \psi} = 0 \quad (116)$$

$$\frac{\partial e_o}{\partial \theta_1} = \frac{\partial e_o}{\partial \psi} = -\sec^2 \omega_o$$

$$\frac{\partial \theta_o}{\partial e_1} = -\sec 2\omega_o \quad (117)$$

$$\frac{\partial \theta_o}{\partial \pi N_1} = -\text{tg } 2\omega_o$$

The choice of a compensator to give greatest accuracy in the measurement of elliptically polarized light depends therefore upon the relative accuracy of the measurement of e_1 and θ_1 , the ellipticity and azimuth of the compensated light. If e_1 can be measured with the greater accuracy, a quarter-wave plate gives the more accurate determination of θ_o , while a plate of lower order, $\pi N_1 = \omega_o$ approximately, gives the more accurate determination of e_o . If θ_1 can be measured with the greater accuracy, the reverse is the case.

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I.—*Financial Legislation in Principle and in History*

BY W. G. LANGWORTHY TAYLOR

Governments have sought to regulate and to monopolize not only the money of communities but also their credit. It is noteworthy as a further proof of the dominant position of credit in the financial world, especially as compared with money, that, notwithstanding the efforts of governments to control the credit system or to monopolize it for the selfish purpose of potentates or of parties, they have been able to break down, destroy, or to assimilate and absorb but a small part of the credit activity of the community. In Oriental countries, it is true, enterprise is throttled by taxation, which is the surest means to that end; but in a country where credit is well developed, the government is forced to face the problem of taxation in a spirit of scientific impartiality. The highly developed credit system of the United States will force that government into scientific methods of taxation.

Nevertheless, precisely through the channel of taxation, civilized governments have learned to use credit in a way which is especially open to the abuses which we have seen inhere in a period of highest expansion, and thus to weaken business credit. Governments seek to pay their expenses, or rather to obtain credit for their debts, by the issue of paper money. Probably no government paper money was ever issued which was not expected to be redeemed in full value at some time, although that time

might be distant. Such a thing as fiat money has never existed as a proposition embodied in legislation. Nevertheless, the issues of government money that have not been paid, or the payment of which has been either formally or tacitly renounced, have been very numerous, and the term fiat money has been attached to them. We shall give a very brief statement of the arguments for and against the issue of government money, and follow it by some discussion of the regulation of banking by government.

Among the advantages of government paper money has been mentioned the saving of interest for the government, since by that means it is able to make a loan free of interest, whereas, if it borrowed upon bonds, it would have to pay interest. But this advantage is far overbalanced by the swollen debts¹ incurred in depreciated currency, that is to say, really at high rate of discount. It is also stated that government money is uniform and avoids multiplicity of issues by different banks; but in answer to this it may be said that it has been found easy to cause private banks to reduce their issues to uniform appearance and denomination, and that government guaranty of private bank notes gives them a uniform exchange value, if the government is a sound one.

It is true that, in times of war, finance ministers have frequently resorted to issues of government paper. The argument has been made that it was necessary. That argument was made with especial cogency at the beginning of the civil war in the United States. Here and there a rigorous economist of the orthodox school, like Professor Simon Newcomb, the economist-astronomer, raised his voice in protest.² It was claimed that the credit of the government in the form of paper money was no better than in the form of bonds, while the paper money, by virtue of its legal tender quality, caused the circulation and prices of the country to fluctuate in value with great violence and brought an unnecessary uncertainty into business. This, indeed, is the strongest indictment against government paper money. It is worthy of note that

¹Professor W. C. Mitchell estimates the loss of the United States Treasury from this source, on account of the civil war, at over one-fifth of the war debt. *History of the Greenbacks*, p. 419.

²*A Critical Examination of Our Financial Policy during the Southern Rebellion*. Appleton, 1865.

the most enlightened governments have been able to restore or preserve a good medium of exchange even when the credit of the country was heavily strained. For instance, the Russian and Austrian governments, without any notable reduction of the public debt, have in recent years restored their money system to a fairly sound condition.

Nevertheless, at the moment of catastrophe, when means of somehow coming to a temporary understanding with a vast body of creditors that have suddenly sprung up, as if from the dragon's teeth sown by Cadmus, seem to be imperatively needed, it has been found impossible to avoid a temporary issue of paper money. This was true of the French government at the time of the Franco-Prussian war. It is to be remarked, however, that the French paper money was issued, not directly by the government, but as notes of the official state bank. One can see that it is simpler for the government, under such circumstances, to give visible receipts for the services performed by contractors and soldiers than it would be to keep a book account of such vast debts. Under such circumstances, it is incumbent upon the government to fund such receipts or warrants as quickly as possible, in order that the evil effect of their use as a circulating medium may be speedily terminated. Accordingly, the French government began its payments to the bank as early as the year 1874, in order to enable the latter to contract its issues, and resumption of specie payments was effected early¹—January 1, 1878—whereas, not until a year later did the United States resume payment of debts that had been put into the form of government money ten years before the Franco-Prussian war.

It was said by Professor Newcomb² that the national banks were not an improvement upon direct loans by the government, as a means of borrowing by the issue of paper money, since their credit would depend upon the credit of the government, so long as their reserves contained government paper money rather than specie. In time of war, however, if the exigency of the moment is very great, finance ministers resort to all sorts of expedients,

¹Dunbar. *History of Banking*, p. 143.

²*Op. cit.*, ch. VIII.

and, in our country, a great many different forms of money were invented in order to avoid the appearance of an over-issue of any one kind. This was as truly a means of deceiving the public as many resorted to by promoters of private schemes.

One of the greatest disadvantages of government money issues is that, in the present state of public knowledge on such matters, they cater to a popular misconception as to the nature of the circulating medium, namely, the idea that if anything can be made to work as a *circulating medium* it must also be a successful and trustworthy *standard of value*. The public is quite willing to be deceived as to the circumstances in which the function of a circulating medium may be separated from that of a store of value. However, that disadvantage may be gradually remedied by education.

Another disadvantage, perhaps greater, is inelasticity of government issue. Even where banks are compelled to put up bonds as a guaranty for their circulation, there is usually some provision for expanding or contracting the currency, even though that may take place slowly. Where the government establishes a state bank and merely interferes in its operation through appointment of its officers, as in France and Germany, the circulation may be highly elastic; but where the government issues paper money to pay for supplies and services to the government, taking back the paper money again simply in payment of taxes or of certain kinds of taxes, there is no possibility of expanding and contracting it according to the needs of business. It has been, indeed, proposed that the currency should be systematically contracted and expanded according to the price of gold, but it will be noticed that the changes in the volume of currency effected by this artificial manipulation could not take place until after the price of gold had fluctuated; consequently some fluctuation in the value of the circulating medium would occur before means could be taken to restore the disturbed parity between the paper money and the gold. The remedy is based upon the hypothesis of a disease.

But the whole fallacy of the proposition lies in the simple fact that we have here an attempt to supplant a private circulation by a public circulation. This, in the nature of things, can never suc-

ceed, for it has already been demonstrated that the circulating medium of the country consists in the guaranties accompanying private business contracts. Those guaranties are there and must be there to do the work. They can not be excluded, except by stopping the work of circulation altogether, or at least by stopping the creation of the congeries of contracts which is necessary to uphold the structure of business. In order to carry on business without such contracts, it would be necessary that every particular act of production, down to the smallest, should be directed from a central bureau. Such a state of affairs would amount to a prohibition laid upon private arrangement and private contracts, or, in other words, to an abolition of all thought or responsibility on the part of the people. But there is nothing too absurd for the imagination of scheme makers. Fortunately, in the United States, where government money circulates, it has been impossible to prevent dealing in deposits or entirely to exclude the use of bank notes.

The government is not a producer of industrial values, in the ordinary sense of the word. It is not to be denied that government does produce the values of security, of the administration of justice, of public recreation; it also does produce some industrial values in the shape of lighthouse protection, regulation of rivers, building of roads, and sometimes the building or ownership of canals and of railroads, and even of theaters; but one can readily see that these undertakings will not be pushed forward at periods which will correspond to the fluctuations in private business. In fact, public works are often carried on in periods of depression, in order to give work to laboring men. However beneficial such charitable activities may be, it is not perhaps to the benefit of commerce that attempts should be made to expand the circulation at a moment when the healthy action of the organism of business requires contraction. Moreover, the product which the government elaborates is not sold in the market for goods; it is apparently given away. Payment comes in the form of taxation. If the government apparently pays for these good things with paper money, the paper money must be redeemed some time or other by means of taxation. Ordinary business

credit is taken up when the goods are sold and new government credit is substituted. The substitution of payment by means of taxation for payment by means of sale and liquidation with further organic credit is like the mixing of oil and water. The movement of government credit does not correspond with the movement in private credit and is a decidedly disturbing factor.

For instance, preceding a crisis, it is highly desirable for specie to be exported from a country, in order that bankers and other debtors may be stimulated to exert a pressure upon those who, in turn, owe them, and thus, throughout the whole credit structure, responsibility be encouraged and bad business be weeded out. The crisis should thus be averted by its early precipitation. *Similia similibus curantur!* In a country, however, even with such a small proportion of government money as has the United States, it has been found that this money has left the reserves of the banks and floated to the seaboard in attempts to cross the ocean, but, like the potato bug, has been unable to do so. There, heaped up in the vaults of banks in the great seaports, it has encouraged speculation at a moment when that should have been discouraged. The bears in Wall street readily seize a period of depression combined with easy money to hasten on a catastrophe which otherwise might have passed over with a moderate and reasonable period of liquidation.¹ The disadvantage from government that flows from its depreciation and the consequent ruin of creditors has been so often exemplified in history and has been dwelt upon so much that we hardly need to discuss it further.

Probably one thing that induces the public to vote for government paper money is the idea that government credit is better than private credit. Undoubtedly, in time of peace, government credit is better than that of most corporations, but it certainly is not better than that of the whole business community, whose credit, as we have seen, is generalized in the circulating medium, so that each portion of the latter depends upon the solvency of the whole.

Another popular fallacy, which has supported the policy of gov-

¹F. M. Taylor, *Do We Want an Elastic Currency?* Political Science Quarterly, vol. 11, March, 1898.

ernment paper money is the total misapprehension as to the organic origin of money. This mistake is unavoidable, since the perception of the truth in this matter requires no ordinary ability and education. It is a point, like excessive protection, on which, perforce, we must resign ourselves to wait for the growth of public opinion. It is popularly supposed that money "represents" present goods, and that it acts as a circulating medium for this reason. Hence the whole brood of propositions that have been made and attempted to be enforced, from early times, to "coin all the production of the country into money." It has been looked upon by several party conventions in the United States, as a self-evident proposition, that the money of the country represented its produce, and that, therefore, the value of the produce should be coined in order to circulate it. It was not supposed that a proposition of that sort needed the slightest discussion; it was not supposed necessary to stop for a moment to be more precise about the word "represent." This is a point that even students of political economy have not squarely met. The recent development, however, of the theory of subjective values enables us to make the deduction that money does not represent the present goods, but represents future goods, and consequently the inflationist's argument, so far as it is grounded on a false quantity theory and neglects the natural, organic genesis of credit in unexecuted contracts, falls to the ground.

Another objection to government money is that, while there is a gain in payment of interest, the usual depreciation of it puts upon the shoulders of the government, when the day of reckoning arrives, a burden far out of proportion to the values received. For instance, it is estimated that the United States has paid several times what the civil war cost, on account solely of the depreciation of the paper money issued. Private parties lose on any money which they happen to hoard, not only the depreciation, but also the high interest that they are compelled to pay if it is borrowed, in order to make up to the creditor, who expects to be paid in such money, for the depreciation of his principal. Creditors lose in so far as they have not foreseen the extent of the depreciation. Curiously, when paper money begins to depreciate, the

argument is always made that more money should be issued, in order to lower the rate of interest. Doubtless, before depreciation is very pronounced, a small additional issue of money will have a temporary effect to lower the rate of interest in the locality where it is issued; but, when the depreciation is rapid and has gone very far, probably no effects of this sort would be noticed. Finally, an issue of government paper money is a confession of bankruptcy on the part of the government; it probably tends to lower the government credit more rapidly than the issue of government obligations in any other form. It is astonishing what a vast quantity of government bonds can be absorbed, if only some time be given in which to issue and market them, whereas the field for government issues of paper money is strictly limited.

Passing now over to the question of government regulation of private credit, we shall confine ourselves chiefly to government regulation of the most prominent credit institutions, namely, banks. The following is a short account of the development of the credit theory as applied to banks, of the growing appreciation of it by governments and by bankers, and, in general, of the attempts to bring bank regulation into conformity with the real needs of banking. It will be seen that this question, like any other, presupposes a knowledge of the facts before it can proceed to intelligent discussion, and that, when the facts are once known, the hardest parts of the discussion have already been accomplished.

Here we may pause to remark that what is known as theory, and often condemned as such, is really nothing but an attempt to get at the facts. To a person that has not made this attempt it appears to be unnecessary, because the facts are supposed to be self-evident or to depend simply upon observation. On the contrary, facts are not self-evident, and they depend upon an observation which, to say the least, can not be made with the outer eye. The facts once agreed upon, the measures of government to be taken will depend upon abuses that have been experienced, but also upon the popular conception of what the facts are. The measures taken by government upon the facts connected with a particular form of social service, such as banking, are never the

same as they would be if the people at large had a different or more correct idea of what the facts were. A law is a compromise between the popular error as to what the facts are and what would otherwise be the logical conclusion from the facts themselves.

Misconception as to the organic nature of credit has given rise to discussions concerning the elasticity of the circulating medium, and especially of bank money. The clearing up of this discussion has depended upon the working out and popularizing of the idea that "business makes money." In England, William Dunning McLeod, and in the United States, Professor Charles Franklin Dunbar, are chiefly to be thanked for the prominence they have given to this principle. It has been, however, extremely difficult to bring it into a clean-cut form, even with the help of catchy phrases. The supposed distinction between notes and deposits has been the stumbling block in the way of a clear conclusion, for the theory of banking does not contrast them with each other, but both with reserves. The popular materialistic preference for notes and the perverted term "deposit" have led to endless confusions.

Originally, a banker was a dealer in money. He sat behind a table or "bank" holding his money, and was little more than a money changer. It became easy, however, for him to do business in exchange, in other words, to buy and sell money for future delivery; and in that way he made loans, but these operations were looked upon purely from the materialistic side. The notes and deposits that he soon learned to give in making his loans were called "money." The financial world, even up to the top, has always been obsessed by the tyranny of this verbal confusion between the bailment of material money in return for hire, analogous to the hiring of a horse at a livery stable, and the making of promises for future delivery of money, instead of perceiving that those promises for future delivery were not meant to be carried out literally, but were simply used by business men as a guaranty for the fulfilment of business contracts. Money theories have kept as closely as they could along popular, materialistic lines, and have treated notes and deposits as money, and looked

upon their value as subject to the same laws as those to which a commodity is subject. Among the inflationists, the fallacy persists in a crude form, "that money is what money does," that is to say, if the circulating function is established, the standard of value function will take care of itself. And the further fallacy persists that a bank deposit is practically money, because it is supposed to represent money deposited in a bank, whereas the literal deposit of money in a bank is but a survival of an ancient and superseded business, out of which banking indeed sprung. However, so far as application today is concerned, the notion is as fallacious as is the other that a laboring man is a slave because, in ancient times, labor was done by slaves, and because it may be historically true that the laboring man is evolved from the slave.

It is along this line of popular thought that everyday language calls a bank loan a loan of "money," and assimilates it to the hiring of a livery team. The banker is popularly supposed to be a dealer who takes people's money on deposit, that is, for safe-keeping, and loans their money out *again* (lay great stress upon "again"); whereas observation shows that there is no more than the slightest grain of truth in that idea. One would think that universally the introduction of the business of the safe deposit company, the facilities of which are often used for deposit of specie, would cause people to inquire as to the difference between this revived old deposit business and the modern guaranty business; but when a form of speech is once rooted in the language it is almost impossible to eradicate the fallacies that cluster about it. A large part of the work of students in the political sciences consists in showing that new meanings attach to old terms. It is most curious that the misapprehensions here again alluded to should prevail in the face of the fact that almost everybody deals with a bank nowadays. He knows that the largest part of his deposits come from his borrowings in his business. Why should he not draw the natural conclusion that the orders which he deposits come also from loans made by the persons who have made payments to him? A simple illustration of this sort shows the crying need for economic, and especially for financial, education. Although banking business has been developed in practically its

present form for two centuries, the popular theory is still that of the money changer on the Rialto; and yet the economist is perpetually met with the question whether there is any practical application of economic theory.

While the banker himself has accepted some of the false conclusions of nominalistic reasoning, he has rejected others, and is gradually emancipating himself from the rest. Under the direction of arbitrary legislation, he opens his profit and loss account on notes separately from that on deposits; he looks upon his notes as issued, not for loans, but for bonds, in this country, in the face of the obvious fact that he buys his bonds with his capital; and in foreign countries, where the deposit business is little developed, he looks upon deposits as a special warehousing business, although he takes the right view there of his notes. And he is only now, after years of false conservatism and confused timidity, receiving his education on the similarity of the note to the deposit, through the efforts of a few statesmen like the Hon. Charles N. Fowler of New Jersey.

As usual in any campaign of education, it has been necessary to educate the banker up to this point by inventing the new and again inaccurate phrase, "an asset currency." This phrase has taught the bankers of the United States that bank notes are merely issued in exchange for individual notes, in precisely the same sense as deposits are exchanged for individual notes, a point that was fully explained by Dunbar and McLeod thirty or forty years ago. It remains to educate the banker and the public as to the peculiar guaranty that this exchange amounts to.

In legislation on the subject of banking we must expect to find some progress, and, as already intimated, we do find it. Distinctly, the discussions of the nineteenth century have led to clearer ideas and to some improvements in legislation. The influence of professors of political economy and of closet students of finance has been, of course, quite indirect. Even what college students have learned on this subject in the last twenty-five years has not been clearly retained by them when in the later hurly-burly of life; and under the pressure of the practical need of the moment they have often lost the general bearings of what they

had been taught. Clearer ideas on any public topic involve a modification of our ideals, and this modification, in turn, leads us into a course of conduct more in conformity with the actual conditions. These conditions, as already implied, consist not only in the physical opportunities afforded by the physical plant of modern life, but also in habits and customs which, whether they be reasonable or unreasonable, are even more slowly modified than the conceptions which we have just shown are changing to suit circumstances.

One such fixed form of thought is as to the special nature of the banking business; that it is much more important than any other business, since it involves control of all businesses. While that view is partly true, doubtless it is exaggerated and leads to exaggerated conclusions. Is the banking business so different from all other business that all the demand liabilities of the bank should be guaranteed by the government? It has been customary for some governments to guarantee the note issues of their banks, or to provide, in banking legislation, that the state bank shall itself put up a guaranty fund for the notes rather than the deposits. And from this the step seems very easy to the putting up of a guaranty for all of the demand obligations, that is to say, for the deposits also. Some countries, like France, do not guarantee even the note circulation. It is significant that the Bank of France, which already has the largest note circulation and whose business is practically entirely a note business, is subject to no legal regulation, except a nominal upper limit of note issue, and that this same bank carries the biggest reserve of any bank in the world. In other words, without legislative provision, it takes the greatest precautions to safeguard its demand obligation. It is only fair to say that the governor of the bank is appointed by the government and that there is considerable room here for government interference.¹

But the business of raising potatoes is a business of public interest,—everybody consumes potatoes. Potatoes are needed even more than bank loans. Why should not the government guarantee the price of the potato crop? The proposition for the state

¹Dunbar. *Chapters on Banking*, 52.

to guarantee all bank deposits in this country is unfavorable to the principle of private enterprise; but the proposition to encourage banks voluntarily to organize themselves into a guild for the defense or insurance of their notes and deposits may be a reasonable one in the present state of public opinion on finance and in the present tendency of businesses and classes toward separatist organization.¹ Such a scheme could not be one of "free banking." The guild must pass on its own membership.

So long, however, as the idea generally prevails that a deposit is evidence of money given to the banker, and that the banker loans out the money deposited, and also the other inconsistent idea, that paper money, whatever be its source, is a long-time standard of value, those ideas will necessarily influence legislation and constitute a part of the restrictions which hinder rather than further business. It is impossible to obtain legislation in advance of the movement of popular opinion. This is a wise provision of an over-watching Providence, which has put the welfare of the whole people above that of any particular institution, such as banking, and which decrees that the imperfections of particular institutions shall not be removed until the whole people has been educated up to the highest point.

There have been two great questions to work out in banking legislation: one as to the elasticity of the currency, and the other, subordinate to the first, as to the approximation of notes to deposits. In early times, notes were used almost exclusively. The deposit business came in gradually, and for a long time it was not considered that a business in deposits was really banking; and when the question of the influence of credit upon crises first arose, bank credit was almost entirely in the form of bank notes. On June 8, 1810, during the suspension of specie payments in England, at the time of the Napoleonic wars, an investigation into the operations of what was known as the bank restriction act of 1797, whereby the Bank of England was allowed to refuse payment on its notes, and in consequence of which the price of

¹For an account of the workings of the Oklahoma deposit guaranty law, vid. W. C. Webster, *The Depositors' Guaranty Law of Oklahoma*, Jour. Pol. Econ., vol. 17, no. 2, Feb., 1909.

gold and the price of exchange rose considerably in England, led to the making of the famous *Bullion Report*, which is, perhaps, the most masterly document that ever issued from a legislative committee.

The most of the *Bullion Report* is occupied by a convincing argument that the rise in foreign exchange and in commodity prices was due to inflation of Bank of England notes, as a consequence of the exemption of the bank from the obligation to pay specie on demand. The key-note of the report is that financial legislation is interference, and that "sound money" is furthered by leaving the banker exposed to his natural obligation as a debtor. But the *Bullion Report* saw clearly the need of loaning according to the demands of business; in other words, that business makes money, that the amount of loans is practically equal to the amount of business. And it went further and indicated that deposits performed the same function as notes. This statement at that early period is so remarkable that it deserves quotation:

"The effective currency of the country depends upon the quickness of circulation and the number of exchanges performed in a given time, as well as upon its numerical amount; and all the circumstances which have a tendency to quicken or retard the work of circulation render the same amount of currency more or less adequate to the amount of trade. A much smaller amount is required in a high state of public credit than when alarms make individuals call in their advances, and provide against accident by hoarding; and in a period of commercial security and private confidence, than when mutual distrust discourages pecuniary arrangements for any distant time. But, above all, the same amount of currency will be more or less adequate, in proportion to the skill which the great money dealers possess in managing and economizing the use of the circulating medium. Your committee are of opinion that the improvements which have taken place of late years in this country, and particularly in the district of London, with regard to the use and economy of money among bankers, and in the mode of adjusting commercial payments, must have had a much greater effect than has hitherto been

ascribed to them, in rendering the same sum adequate to a much greater amount of trade and payments than formerly. Some of those improvements will be found detailed in the evidence: they consist principally in the increased use of bankers' drafts in the common payments of London; the contrivance of bringing such drafts daily to a common receptacle, where they are balanced against each other; the intermediate agency of bill-brokers; and several other changes in the practice of London bankers are to the same effect, of rendering it unnecessary for them to keep so large a deposit of money as formerly."¹

The Bank Act of 1844, known as Peel's act, professed to be founded upon the principles of the *Bullion Report*, which, however, in some respects, was profoundly misinterpreted by the act, for the *Bullion Report* was infused with the spirit of freedom that prevailed at the time that it was written; whereas Peel's act endeavored to restrict the issues of the bank within the narrowest limits. The *Bullion Report* understood that notes were issued in response to the needs of commerce, whereas Peel's act looked upon the issue of notes as an issue of money. Peel's act, therefore, looked upon notes as a standard of value, whereas the *Bullion Report* looked upon them as a means of circulating goods.

The act fell into this error, doubtless, also, through the influence of the materialistic reasoning of the economist Ricardo, whose doctrines, correct as they are in many respects, and hedged about with every safeguard against absurdity of conclusion, nevertheless gave a wrong turn to analysis of money and credit. Ricardo was trying to account for the level of prices, and jumped at the apparently obvious conclusion that the contraction of the amount of paper money affects the level of prices in the same way that it is affected by the similar movement of metallic money.² Peel's act, accordingly, sought to make every paper pound in circulation as good as a gold pound. It required that for every pound of paper money, i. e. Bank of England notes, issued, a corre-

¹*The Bullion Report*, Sound Currency, vol. II, no. 14, p. 23. Vid. also, W. G. Sumner's *History of American Currency*, Appendix.

²David Ricardo. *Principles of Political Economy and Taxation* (E. C. K. Gonner, ed.), par. 125.

sponding pound of gold should be put in the reserve. Doubtless the effect of this legislation was to accelerate the use of deposits, since no real credit business could be done under legislation of this sort.

In order to drive this legislation to its logical conclusion, let us suppose, for instance, in this country, that a "popular" policy should require the banks to put up a dollar of gold for every dollar of deposits that appeared upon their books. Unless some new financial expedient were immediately discovered whereby business guaranties could continue to be independently made, it is little exaggeration to say that business enterprise would come to a standstill, and that the lawyer would have to make his own shoes, and the shoemaker would have to plead his own cause, until, at least, the antiquated money system could be resurrected. But it is not probable that any such extravagance will be legislated, for the simple fact that the logic of events is more powerful than the logic of the street corner. Business must have its guaranty, no matter what the politicians, or the legislatures, or the statute books think about the matter. Government guaranty of deposits also is calculated to weaken free competition and hence responsibility in banking. It gives the politician-banker an advantage over the tried, experienced banker, and discourages the latter.

We must look upon the *Bullion Report* as an academic production, and upon Peel's act as an attempt and a beginning of legislative reform. It is admitted to have had the good effect of stimulating the banking department of the Bank of England to keep a larger reserve in time of crisis, and thus, indirectly, to have brought into greater prominence the difference between circulating and guaranty functions. The act also recognized that inflation comes through credit, although it made the big mistake of thinking that it comes solely from expansion of notes; for it attempted to prevent crises by restricting the issue of notes alone. The banking department, consequently, was caught with an insufficient reserve against deposits several times thereafter, until it learned its lesson from experience. It had little to learn from the act.

The first two United States Bank acts, those of 1781 and 1816, recognized the resemblance of notes to deposits to this extent, that they did not mention the distinction between the two in limiting the amount of obligations into which the bank might enter to twice the capital together with the reserves; but, as already mentioned, deposits were in those days insignificant in this country as well as in Europe, and probably were not thought of especially in the framing of that provision. The present National Bank Act made formally a backward step by restricting its guaranty fund to the notes loaned. Of course, it could not have guaranteed deposits by a dollar-to-dollar guaranty. The mention of notes at all is a symptom that deposits were, by that time, 1864, becoming more important. But the act made a step forward in limiting the amount of notes loaned to the capital, and thus allowing obligations in the form of deposits to be increased indefinitely. Finally, in 1894, under the stimulus of the general financial discussion that was going on in the country, a plan was presented at the annual meeting of the American Bankers' Association, held in Baltimore, which proposed to do away with the deposit of government bonds as security for the notes, but to secure the notes by a guaranty fund to be raised by a tax upon the bankers as a guild.

This idea is bearing fruit and has thoroughly permeated recent, general, intelligent discussion of the banking question. Men are beginning to ask, Why should bank notes be absolutely secured, especially when bank deposits are not thus secured and can not be? It is true that reformers of the more popular order, taking the other horn of the dilemma, are asking why should not bank deposits be made just as safe as bank notes? In general appreciation of intelligent people, the "banking principle" in spirit is now getting the upper hand above the "currency principle." The movement is not confined to this country. "The proposition to make a rigid requirement to invest deposits and reserves in absolutely good securities is not a new one; but it is impracticable. Among other bad effects, it would completely paralyze a bank which desired to make a judicious investment of the resources that it had acquired from third parties; good bills of exchange,

drawn by solvent persons, are preferable to a portfolio full of stocks and bonds subject to the fluctuations of the stock exchange and which could not be sold on a falling market in the case of a crisis. Almost all banks invest temporarily in government bonds, but the English banks have learned to their cost the disadvantage of holding English consols for the last two years. Those banks have been compelled to change their investment in order to stop the effect of the depreciation of the 'best security in the world,' which had fallen in a few years from 114 to 91."¹ While the language of Raffalovich is that of business rather than that of science, it shows plainly the evils of banking on bonds, and, incidentally, of government interference in the banking business. The same point has been made by Juglar.

It may be noted in passing that the object of American legislation with respect to banks has been different from that of English. In England it has sought to prevent crises by making inflation impossible; in the United States the object has been more democratic, namely, to provide absolute security for the circulation. It has been supposed that notes were more used by the common people, and hence more deserving of protection. Protection of this sort, however, has been accompanied by inelasticity. It would appear, at first sight, that the small circulation in the United States, compared with the business done with deposits, would make the question of elasticity of the circulation of comparatively little importance. There is much truth in this view, and perhaps that is one reason why the country has been so behindhand in obtaining better legislation upon the circulation. Nevertheless, as Dunbar aptly remarks,² we can not tell how large the circulation might be if it were not restricted by the requirements of bond deposit. This is only another way of saying that legislative regulation confining its attention to notes, like that contained in Peel's act and in the national bank act, has stimulated unnaturally the growth of the deposit system. Are we to infer that when legislators thoroughly interest themselves

¹ Arthur Raffalovich. *Marché financier*, 1901-2, p. 62.

² *Op. cit.*, p. 75, sqq.

in deposits also, the banking business will be destroyed? However, everything points to the view that the deposit system must ultimately almost entirely supersede the circulation. So long as circulation is wanted, however, it should be properly regulated, if regulated at all, and should not be regulated in such a manner as to derange the level of prices and the rate of interest, or to stimulate stock speculation.

The law of June 3, 1864, under which the national banks of the United States were organized, constituting really the third national bank of this country, abolished the limit of bank indebtedness that had been set for the first and second United States banks. This change may be looked upon as a distinct advance in the line of elasticity of bank obligations, and, in view of the restrictions imposed on the circulation, as a decided favoring (or neglect) of deposit business. On the other hand, it followed the prevailing fashion in concentrating the regulating and paternal care of government upon circulation, following in this respect the so-called "free banking system" of New York, as well as Peel's act. The inconveniences connected with this sort of regulation were keenly felt by the business world at the time of the rapid payment of the United States national debt under secretaries Manning and Windom in the ninth decade of the last century. As the debt was paid off the bonds deposited for secured circulation were rapidly retired, and the circulation with them.

Consequently, in 1894, the convention of financiers in Baltimore formulated a new plan, henceforth known as the Baltimore Plan, which proposed to follow the so-called "safety fund system," also of New York, the central idea of which was simply the formation of a fund to secure the circulation through a tax upon the banks. This proposition, of course, marked a step towards more ideal conditions, for it removed the government guaranty, and to that extent placed the circulation more on an equality with the deposits, and gave it freedom of expansion. But it was merely a project, and, as such, was the starting point of a long agitation, the end of which has not yet been reached. This movement was followed by the Indianapolis Convention of January, 1897, which discussed thoroughly the principles of monetary

finance from a scientific point of view, and made progressive recommendations.¹

After the strenuous monetary political campaign of 1896, and in view of the then impending campaign of 1900, congress was compelled to take action upon the action of the currency, and passed the Act of March 14, 1900, which is a monument of timidity. The first object of the act was to secure the gold standard, and this it sought to do by increasing the treasury reserve against government notes, and by giving to the United States Treasurer additional facilities of borrowing in order to maintain it. The best way to maintain the gold standard would undoubtedly be to abolish government paper money altogether, and to enforce strictly redemption of bank circulation by the banks themselves. It was not, however, felt that the country was ready for such a liberation from financial swaddling clothes; the labors of a long series of monetary reformers were neglected. So the act made a slight move towards greater note elasticity by allowing the banks to issue notes up to 100 per cent of the bonds deposited, instead of the 90 per cent theretofore permitted, by allowing them to reissue notes just after they had retired them, instead of the period of delay which a law of 1882 had prescribed, by reducing the tax on circulation, and by reducing the interest on the bonds put up as security. Action of this sort is noticeable for our purposes chiefly as showing that the question of elasticity of the currency was under actual discussion, and that the legislature, although reluctantly, was compelled to acknowledge the pressure of enlightened ideals.

The Hon. Charles N. Fowler has, in a series of often amended projects, offered to the country a measure of real reform, and must be looked upon as one of the best educators of public opinion to be found in political circles. Even his proposed bills do not go to the full extent of complete freedom of issue, but are largely influenced by the German model. He proposes to remove the bond guaranty; he advocates the safety fund; and, until his last bill, he proposed to tax additional note issues at an increas-

¹Vid. *Report of the Monetary Commission of the Indianapolis Convention, 1898*, by J. Laurence Laughlin.

ing rate. For some reason he has advocated, in his latest proposition, a uniform tax on all issues.

The safety fund principle would appear to be in accord with the *political* movement of the times. The tendency now is for all interests to unite, each in its own domain, thus forming separate guilds or economic classes. The consolidation of the laboring classes into national trade unions on the one hand, and of almost numberless manufacturing interests into national and international trusts, on the other hand, is an evidence of this spirit of the age. That legislation should go along to help the banks to combine into one national guild is not surprising, although quite inconsistent with the protestations of the legislature that it is deeply concerned to maintain competition which is understood by it to mean "small businesses." The law recently passed by the United States congress,¹ facilitating the union of banks in different sections of the country, is quite along this line, and, in this political sense, indicates a movement in advance, although the requirement of deposit of the private notes purchased with the emergency circulation is retained. These local associations, however, are trivial affairs, as they only have authority over the emergency circulation, which is to be taxed 10 per cent per annum. Mr. Fowler has also proposed that the banks should assume the redemption of the United States notes, and had provided a measure by which the latter should finally be paid off by the banks without expense to the government. But this enlightened provision has also been dropped.

We must content ourselves with this brief sketch of legislation on the subject of credit, designed less for information about the various acts mentioned than to afford some notion of the extent to which the organic conception of credit is getting a foothold. History of banking legislation is only one phase of the history of corporation legislation in general. Corporations were originally chartered in order to secure the benefits that would accrue to a large number of different persons of moderate means who might, by laying their capitals together, create a fund adequate to the

¹Approved May 30, 1908.

size of the enterprises of exploration, trade, and manufacture, which the growing markets of the modern world invited. Indeed, it has always been possible for persons of means to do this. The first encouragement from governments consisted, however, in privileges of monopoly and of the exercising of sovereign power in foreign parts, which made it seem more attractive and safe for these large partnerships to be constituted. Subsequently, the principle was extended to the more modern business enterprises of manufacturing and banking. It was noticed that the associates often suffered very seriously from legal responsibility which they were subject to with respect to enterprises over which they had little or no control, and with which they had little or no connection, except the important fact that, through the society they had formed, they contributed to them their capital. The idea that responsibility for management was all too strictly associated with contributions of capital was awakened by the fact that many of the contributors were women and minors, persons that were not supposed to be fully competent in business matters, and therefore deserving of the protection of the law. Consequently, a general course of legislation was entered upon in all countries, tending to render the associates in business enterprise free from responsibility for the failure or mismanagement of the enterprise, beyond the sums which they had severally contributed, or, as in the United States National Banks, beyond a limited multiple of such sums.

Thus, the legislative encouragement towards the laying together of capitals was followed by a separation of economic interests from economic responsibility, and out of that weakening of individual responsibility sprang up bad management, incapacity, flagrant abuse, and speculation. The attempt to cure the second series of evils was not met by removing the original cause,¹ namely, the privileges and immunities whereby the associates were induced to come together. Doubtless that could not

¹Parallel with this remedying of the evils of limited liability of stockholders by a system of checks and balances is the remedying of the evils of note-inelasticity by a mechanical note-redemption enactment. The requirement of a pledge of bonds made the notes inelastic. The radical cure lies in the repeal of the requirement, as proposed in the Fowler bill.

be done. The world needs large capitals, and in the event of the failure, say, of the United States Steel Corporation, it would seem ridiculous to exhaust the little remaining property of a man of small means simply because he owned a share or two in that corporation.

However, enlightened legislation should look partly in that direction. If the responsibility of the shareholder were greater, persons would be more careful in putting their means where they would have little influence in the management of them, and while the amount of capital brought together might be somewhat less, with that lessening the growth of monopoly would be checked, and the tendency would be to make the management more conservative. But our modern legislation seeks to cure the evil, not by removing the cause, but by an elaborate system of palliatives, a system of "checks and balances," by inspection, by registration, by sworn prospectuses, by prescribing the substance and form of the organization, and, finally, by official valuation of the assets. Perhaps, in the view of the state of public opinion, that is the best that could be done. Certainly there are ways of doing this well, and of doing it ill. European countries have been more thorough in this detailed legislation than the United States, although the United States is moving rapidly in the direction of elaborate checks and balances. It is to be noted that the European laws, excellent as they are and formulated by mixed commissions of legislators and economists, after inter-parliamentary sessions lasting many years, have been unable to prevent many cases of most flagrant abuses of trust, on the part of banking and other institutions, from arising. The involving of the Leipziger Bank in the failure of the Cassel Trebertrocknung concern was one of the most notable cases of this sort in recent years. "In Germany the great banks take a very active part in industry and commerce. Naturally the risk is very great, if the directors and officers are unable to resist temptation. This is the price that must be paid when financial institutions make industrial investments."¹

Banks, along with other corporations, have gone through all

¹Raffalovich, *op. cit.*, p. 54.

of the stages of attempt to cure the results of bad theories of paternalism with more paternalism,—of attempts to increase competition by regulation of the form of business, rather than (what is the manifest duty of legislation) by simplifying, expediting, and sharpening remedies for wrong doing between man and man. Democratic tenderness at the possibility of offending a citizen who is a voter has played its part in this misdirected legislation, which has erected the corporation as a man of straw which can be clubbed when anything wrong happens, and thereby the sense of justice be appeased for the moment, at least, by the erroneous impression that an evil-doer has been punished.

The object of legislation should be to recognize a clear distinction between *organization* for the purposes of production, on the one hand, and *individual responsibility* on the other. The former should not be allowed to interfere with or to obscure the latter. The fact that the stockholder is removed from responsibility should not destroy the amount of personal responsibility to be located somewhere in connection with the enterprise. Some one must always be found who has the full original amount of responsibility. Apparently, the proper person is the corporation officer. Suppose that the corporation officer has small pecuniary interest in the concern and that he has no property: obviously the only way of securing responsibility is by criminal process. No organization for protection should be allowed to stand between the wrong-doer and his punishment. The official who loots the stockholders through the fiction of a corporation, and then of a construction company or similar misuse of the purposes of the corporation form, should not be protected. The courts have been heretofore too much inclined to protect evil-doers of this stripe, not because they were blind to the evil, but because they could not see their way out of the corporation legislation, and because the legal fiction of a corporate person or entity has very naturally, in the minds of men of the legal profession, overshadowed the plain economic responsibility, which is always to be found in natural persons alone. If, however, they had recognized from the first that corporation legislation was strictly for the purpose of production, and that, when it comes to a question

of responsibility and wrong doing there is no such entity as a corporation, perhaps they could have given a better turn to the law.

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United States: Dawes, *The Banking System of the United States*; Boiles, *Practical Banking*, part I, ch. III, *The National Bank System*, pp. 9-14, ch. V, *How Banks are Organized and Issue Notes*, pp. 16-24; Walker, *Money*, ch. XXI, pp. 443-79; Rhodes, *Journal of Banking*, March, 1890, p. 217 (Unprofitableness of investment in U. S. bonds); Juglar (Banking on bonds a bad system); White, *Money*, pp. 134-235; McLeod, p. 907; *The World of Finance*; *The Central Reserve Bank*, quoting from A. B. Stickney's address before the Marquette Club of Chicago, *Harper's Weekly*, December 28, 1901 (cf. 1335, no. 2349, of *The Nation*, December 19, 1901, p. 467, Branch banking); Root, *Currency Elasticity*, *Sound Currency*, vol. III, no. 23; Andrews, pars. 92, 93, 142-45; Gouge, *The Curse of Paper Money*; Newcombe, *Financial Policy of the United States*, ch. VIII; Hendrix, *Banking not a Monopoly* (cf. *Nation*, August 25, 1898, p. 141); McVey, *The Populist Movement*, p. 192 (Fundamental ideas of those demanding government money); Knies, *Credit*, vol. II, p. 230 (Banking on bonds), p. 454 (Government money not issued for economic but for administrative purposes).

General References: Sumner, *History of Banking*; Conant, *History of Modern Banks of Issue*; Davisson, *History of Banking*; Rogers, *Economic Interpretation of History*, ch. X, pp. 205-24; *International Monetary Conference of 1881*, p. 219; Cunningham, *Growth of English Industry*, vol. II, p. 222 (Goldsmith Bankers), p. 390 (Rise of loan system); Paul Leroy-Beaulies, *Condition for American Financial Supremacy*, *Sound Currency*, vol. III, no. 3, p. 3 (Why a government should not maintain a paper currency).

II.—*Taxation in New Zealand*

BY JAMES EDWARD LE ROSSIGNOL AND WILLIAM DOWNIE STEWART

A. TAXATION BY THE GENERAL GOVERNMENT

The New Zealand government is different from both the Federal and the State governments of the United States in that the power to levy taxes of all kinds is practically unrestricted. Theoretically, the British government, in the exercise of its supreme legislative authority, has the right to tax all parts of the Empire, but the right is never exercised. The principle established by the American Revolution, that there shall be no taxation without representation, still bears fruit in the practical autonomy that New Zealand and the other self-governing dependencies enjoy.

Under the Constitution Act of 1852,¹ certain sums were made payable to the British government for defraying the salaries of the governor, the crown ministers, and the judges, and the list of these is known as the Civil List, but as power was given to the New Zealand Parliament to alter these amounts, with the consent of the British government, and as this power has been frequently exercised, and the Imperial government has never withheld its consent, the taxation thereby imposed is merely nominal and such as the Dominion requires to impose in its own interests.

It should also be stated that certain bills dealing with taxation, such as bills imposing differential duties which bestow exceptional advantages upon foreign over British trade, and bills which appear to be inconsistent with Imperial treaties, must be reserved for the approval of the Imperial government; otherwise the Dominion is free to regulate its commercial policy and its entire system of taxation as it sees fit.²

¹15 and 16 Vict., cap. 72.

²*The Constitution and Government of New Zealand*, Wellington, 1896.

The New Zealand government is not hampered by any constitutional restrictions as to the purpose for which taxation may be levied, nor is there any prohibition of class legislation nor any clause in the Constitution Act forbidding the taking of private property for public purposes without due process of law, although as a matter of fact this is never done. The government has a free hand. It may and does levy duties on imports from Great Britain and other parts of the Empire; it imposes taxes not only for revenue but also as a means to social reform; and many of its laws, as the graduated land tax, would doubtless be regarded as class legislation by American courts. It goes without saying that cities, boroughs, counties, and the other local governing bodies derive their power to tax, as well as all their other powers, from the general government, which in its turn derives its powers from the Imperial government.

The following are the chief heads of revenue and expenditure for the year 1907-8 of the Consolidated Fund, which includes the revenue and expenditure of the post and telegraph department and the railway department, but not that of the other governmental enterprises, for which there are separate accounts.

REVENUE AND EXPENDITURE

REVENUE	£	£	EXPENDITURE	£	£
Balance on 31st Mar., 1907.....		717,825	His excellency the governor.....	7,000	
Customs duties.....	3,103,565		Legislative.....	62,795	
Beer duty.....	113,973		Ministers' salaries and allowances...	14,692	
Stamps (including postal and telegraph cash receipts)	1,550,934		Interest and sinking fund charges.....	2,187,427	
Land tax.....	537,846		Exchange and commission.....	29,486	
Income tax.....	304,905		Pensions, civil and military.....	62,375	
Railways.....	2,765,395		Old age pensions...	330,802	
Registration and other fees.....	129,166		Railways.....	1,963,428	
Marine dues.....	42,217		Public instruction...	843,311	
Miscellaneous.....	218,342		Postal and telegraph services.....	707,146	
Territorial revenue..	289,603	9,055,946	Judicial and legal...	352,163	
Other receipts—			Hospitals and charitable institutions.	145,999	
Recoveries in respect of expenditure of previous years.....		8,043	Defense (including naval).....	214,670	
			Subsidies to local bodies.....	109,591	
			Department of agriculture.....	144,989	
			Mental hospitals...	82,785	
			Valuation department.....	33,096	
			Customs.....	49,579	
			Marine (including harbors and lights)	66,292	
			Printing and stationery.....	46,261	
			Electrical.....	9,668	
			Registration of land and deeds, births, deaths, and marriages.....	31,213	
			Public buildings and domains and maintenance of roads..	67,169	
			Public health department.....	33,253	
			Labor department..	29,047	
			Tourist department.	33,979	
			Contribution to civil service superannuation fund.....	20,000	
			Grant to New Zealand International Exhibition.....	21,000	
			Miscellaneous expenditure.....	172,551	
			Territorial expenditure.....	342,168	
			Other expenditure—		8,213,965
			Transferred to public works fund...		800,00
			Balance on March 31, 1908.....		767,849
		9,781,814			9,781,814

Of the total revenue, as shown here, less than one-half was derived from taxation, and the amounts thus raised were as follows:

HEADS OF TAXATION	AMOUNT COLLECTED	Taxation per head of mean population (excluding Maoris) 1907-8
	£	£ s. d.
Customs and excise	3,217,538	3 9 6
Land tax	537,846	0 11 7
Income tax	304,905	0 6 7
Stamps (taxation only)	585,465	0 12 8
	4,645,754	5 8 4 ¹

It is worth noting, as indicating a centralization of power far greater than that which exists in the United States, that the expenses of public instruction, amounting to £843,311, are defrayed by the general government, that the large sum of £800,000 was transferred to the Public Works Fund for the construction of roads and other public works, that £145,999 was expended on hospitals and charitable institutions, and that the sum of £109,591 was given in subsidies to local bodies. The total revenue of all the local bodies for the year 1906-7 was only £2,812,440. Of this amount £1,338,536 was derived from rates, licenses, and other taxes, including, in the case of the cities and many boroughs, special taxes for water and other utilities supplied by the municipal governments.

The sum total, then, of general and local taxation is about £5,984,290 (\$28,000,000), or £6.3 (\$30) per head of the total population. This is far greater than the total of federal, state, and local taxation in the United States, which does not exceed £4.3 (\$20) per head. Of this amount 52 per cent is derived from duties on imports, and the rest chiefly from direct taxes of various kinds. The revenue from taxation has greatly increased in recent

¹If the calculation be made including the Maoris, the amount per head of population would be £4 15s. 5d.

years. In 1897-98 the general and local taxes were only £4.4 (\$21.38) per head of the total population. This extraordinary increase in revenue has been due chiefly to the great prosperity of the Dominion during the past ten or twelve years.

CUSTOMS AND EXCISE

The subject of excise may be dismissed in a word. There is an excise duty on beer, which yielded £113,973 in the years 1907-9. The manufacture of spirits is prohibited, but the import duties on spirits yield a large revenue. In the year 1906-7, £304,733 was derived from this source. Licenses for the sale of intoxicating liquors are granted by the local bodies. In the year 1906-7 the local bodies derived £48,865 from this source, which yielded £53,635 in the year 1896-97. The revenue from licenses is declining, chiefly because of the spread of local prohibition under "The Alcoholic Liquors Sale Control Act, 1893." However, the consumption per head of alcoholic liquors has somewhat increased, probably because of the general prosperity of the people.¹

The customs duties are the government's chief source of revenue, yielding 66 per cent of the total amount derived from taxation. The foreign commerce of New Zealand is very important. The imports for the year 1907 were valued at £17,304,861 (\$84,000,000), being £18 (\$87) per head of the European population. The revenue derived from customs in the fiscal year 1907-8 was £3,103,567, being 18 per cent of the value of the imports and about £3.26 (\$15.84) per head of the population. It is worth noting that in the year 1906-7 the imports of the United States were valued at \$1,434,421,425 (£300,000,000), being about \$17 (£3.5) per head of the population, and that the customs revenue was \$332,233,363 (£69,000,000), or 23 per cent of the value of the imports, and only about \$4 (£0.8) per head, estimating the population at 85,000,000.

The history of the tariff may be divided roughly into three periods. During the first of these periods, extending from the establishment of constitutional government in 1854 until about

¹ *Year-book*, 1908, p. 395.

1879, the tariff was on a purely revenue basis, although the rates were too low to secure a maximum of revenue. Before 1854 the duties were chiefly *ad valorem*, said to have been unfair to the "conscientious trader." The tariff of 1854 consisted of low specific duties on 21 selected articles. In 1873 Sir Julius Vogel again reverted to the *ad valorem* system and imposed an all-round tariff of 10 per cent. In 1878 Ballance, then treasurer of the Grey government, condemned the *ad valorem* system, saying that it had resulted in a fall in revenue of £33,788 since 1875, notwithstanding the unprecedented prosperity of the Colony. At that time the tariff comprised 250 headings, of which 98 were specific and the rest *ad valorem*. Ballance took 20 headings from the latter class and made them specific, at the same time reducing the duty on tea from 6d. to 4d. a pound and on sugar from 1d. to $\frac{1}{2}$ d. per pound.

The second period extends from the crisis of 1879 to the year 1900 and was dominated by the idea of securing a maximum of revenue while at the same time affording protection to colonial industries. The reaction from the boom period of the "roaring seventies" had set in, and the statesmanship of the next decade consisted chiefly in trying to make the country pay its way. Successive ministries vied with each other in seeking fresh sources of taxation to supply the deficiency. The issue of free trade *versus* protection became the chief political question of the day. Innumerable pamphlets were issued, long debates arose in Parliament, and the trade unions came into active politics for the first time on this question.

In 1879 Atkinson raised all articles then standing on the tariff at 10 per cent to 15 per cent. A commission which was set up in 1880 to report on local industries recognized the fact that the tariff was "distinctly though inequitably protective," and recommended that great caution should be exercised in making any changes except for purposes of revenue, lest one set of industries should be promoted at the expense of others. The tariff was revised in 1882 and again in 1888, when the duties on a large number of articles were raised from 15 per cent to 20 per cent, and many specific duties were raised proportionately. In 1895

the tariff was again altered in the direction of further protection. Up to this time the highest rate had been 25 per cent. Some duties were now raised to 40 per cent, such as the duty on clothing made to order for residents in the Colony.

The third period began in 1900, when the Colony had become so prosperous and the revenue from customs duties so abundant that the Treasurer was able to take the duty entirely off kerosene, rice, and salt and to make substantial reductions on other necessities of life. The next important step, taken by the Seddon government in 1903, was the establishment of preferential duties in favor of British goods. This did not involve a reduction in the tariff but an increase, since the duties on goods imported from Great Britain and other parts of the Empire remained as they were, while a substantial surtax was imposed on 37 classes of goods of foreign manufacture. On 9 classes of goods the additional taxation amounted to 20 per cent of the dutiable value; on 27 classes it was one-half of the duty payable under the regular schedule; while on cement the additional duty was equal to the regular duty. However, the duty on tea grown in any part of the British dominions was wholly removed except on tea in packets not exceeding one pound in weight.¹

This additional taxation, while it did not prevent a slight increase in imports from foreign countries, seriously checked the importation of those goods on which the surtax was imposed, and was correspondingly advantageous to the colonial and British manufacturer, but especially the former. The value of the imports from foreign countries was £2,140,533 in 1903; in 1907 it was £2,360,678. In the same time the value of imports of boots and shoes from the United States fell from £102,054 to £33,466, printing paper from £40,206 to £7,577, furniture from £14,206 to £13,818, and so on, while the import of goods not subject to the surtax considerably increased. The preferential tariff had a less serious effect on goods imported from Germany, although New Zealand imports four times as much from the United States as from Germany. The combined imports from the United States and Germany amount to 75 per cent of the total imports

¹The Preferential and Reciprocal Trade Act, 1903.

from foreign countries. The preferential tariff, therefore, is protective in its character rather than productive of revenue, and is shrewdly contrived so as to give a maximum of benefit to the New Zealand manufacturer and a minimum of advantage to his British competitor, whom, at first sight, it appears to favor.

In 1906 a reciprocity treaty was entered into with South Africa, involving a reduction in the duties on feathers, wines, sugar, tobacco, maize, fish, and tea, the admission of dried and green fruits free of duty, and a reduction of 25 per cent on all other goods except spirits. As the trade between the two colonies is insignificant, little importance as yet attaches to this treaty.

A revision of the tariff was brought about in 1907 under the direction of the Minister of Customs, the Hon. J. A. Millar. The chief features of the new act are as follows:

1. Some more articles of household use, as sugar and molasses, were placed upon the free list in furtherance of the principle of a "free breakfast table."
2. Reduction or abolition of the duty on the raw materials of colonial manufacture.
3. Further protection to local industries.
4. Further extension of the principle of preference to British goods, or, rather, discrimination against non-British goods, so as to cover in all 198 items.¹

It is not likely that the tariff will be touched again for some years to come. At present the duties of the ordinary tariff range from 5 per cent to 40 per cent; those of the preferential tariff run as high as 50 per cent or more, as in the case of the cheaper grades of American-made shoes. The tariff is approved of in the main by the manufacturers and workers, although the manufacturers claim that they do not receive sufficient protection to compensate them for the high wages they are obliged to pay under the awards of the Arbitration Court. The farmers, as a class, are opposed to the tariff, holding to the policy commonly known as the "three F's"—Freehold, Free Trade, and Free Contract. There are also people who consider that the indirect taxes

¹The Tariff Act, 1907.

are far too high, and that relatively more revenue should be raised by the land and income tax, death duties, and other direct taxes. The followers of Henry George, who are quite numerous, hold the usual single-tax doctrine, that the whole revenue should be raised by a single tax on the unimproved value of land. The government pretends that it has made substantial "concessions" from time to time since the year 1900, but these have been more than counterbalanced by increased duties in other directions. In the year 1900 the revenue from customs was 17.85 per cent of the value of the imports; in the year 1908 it was 17.99 per cent of that value. As in the United States, so in New Zealand, promises and pretenses of tariff reduction are largely illusory.

THE LAND AND INCOME TAX

As far back as the year 1844, Lord John Russell sent a circular letter to the colonial governors of Australia and New Zealand recommending a tax on land as the form of taxation most suitable to the conditions prevailing in a new and growing community, but thirty-five years elapsed before such a tax was imposed. In 1844 Governor Fitzroy, who was an ardent advocate of free trade, passed an ordinance abolishing customs duties and substituting a graduated property and income tax of 1 per cent on property and income combined up to £1,000, but no taxpayer was liable for more than £12. The change was welcomed by the traders and whalers, but the settlers ignored and evaded the law, which soon failed as a means of raising revenue, and was replaced by a new customs tariff. No further attempt was made to impose direct taxation until 1878.

At that time the colony was prosperous, though on the eve of a crisis, and Ballance considered that the burden of taxation should be readjusted, in order to make the landowners pay a larger share of the interest on the public debt, which had been incurred chiefly for the building of roads and railways, which had greatly increased the value of land. Ballance's Land-tax Bill was carried, but stirred up much opposition, and, after the fall of the Grey government in 1879, the Act was repealed.¹

¹Land-tax Act, 1878. Reeves, *State Experiments*, vol. 1, p. 258.

Atkinson now brought forward a bill to establish a general property tax on the American model, and the Act was passed on December 19, 1879.¹ It provided for a tax of one penny in the pound (five-twelfths of 1 per cent) on all assessed real and personal property, with an exemption of £500. Atkinson admitted that much was to be said in favor of taxing used lands held for speculative purposes, but considered the policy impracticable. An income tax, also, he rejected as "too inquisitorial and unavoidably open to great inequalities," nor did he think it desirable to attempt to break up the large estates by means of a progressive land tax. The property tax remained in force until September 8, 1891, when it was repealed. The following table shows how the tax was paid in the year 1881:

AMOUNT OF TAX		NO. OF TAXPAYERS
Under £1		5417
£ 1 and under £ 5		9048
5 and under 10		3267
10 and under 20		2146
20 and under 50		1390
50 and under 100		480
100 and under 200		194
200 and under 300		66
300 and under 400		27
400 and under 500		14
500 and under 1000		23
1000 and under 2000		12
2000 and under 3000		1
3000 and under 4000		0
4000 and under 5000		1
5000 and under 6000		0
6000 and under 7000		1
		22 087

The property tax, though by no means onerous, soon became unpopular, chiefly among the small farmers and tradesmen. The usual objections, some valid, but many trivial and baseless, were urged against it. The small farmers disliked paying taxes, however small, upon buildings, implements, and live stock. They suspected their rich neighbors of successful evasion. The trades-

¹Property Tax Act, 1879.

men thought that they paid too much as compared with professional and salaried people, although they shifted a large part of the tax to the shoulders of their customers. It was said that income from property paid too much as compared with income from professional services and salaries. Also, it was held that the law took no account of the earning power of a man's capital, and that people doing a large business on a small capital paid less than their fair share, quite ignoring the tendency of profits towards equalization. Mr. Reeves said in Parliament that the tax was equal to an income tax of 4s. in the pound on a man who was making 6 per cent on his capital, and only 6d. in the pound on a man making 17 per cent.¹ Mr. Reeves also says: "Manufacturers, shopkeepers, and trading companies also found the tax unjust. It hit them as hard in bad years as in good."² This, of course, is an objection that can be urged against almost any form of taxation, since a government requires practically as much revenue in bad years as in good, and a system of taxation which would yield a fluctuating revenue would be highly unsatisfactory.

Mr. Reeves further says: "To these solid grounds for discontent was added the sentiment nourished by the writings of George and Wallace. Avowed single-taxers were, indeed, very few in number, as they still are; but the doctrines of land-nationalizers and single-taxers were acceptable to the extent of distinguishing between real estate and personal property as subjects for taxation. A line was also drawn between ground values and improvements. Large tracts of most of the great freeholds were unimproved. Feeling ran high against land monopoly in 1890, and higher still against absentee ownership. The land and income tax bill of Ballance was greeted as a measure of revolution. It did indeed herald a species of political revolution, which is still in peaceful progress."³

Another reason for abolishing the property tax was that the government required more revenue, and it was thought that this could be secured more easily by taxing the wealthy classes than

¹*Parl. Debates*, vol. 71, p. 190.

²*State Experiments*, vol. 1, p. 259.

³*State Experiments*, vol. 1, p. 260.

by increasing the tax on property in general, which would have aroused a storm of opposition. But, whether rightly or not, the property tax was condemned by the small farmers and tradesmen, and when, in 1891, these classes got the upper hand, with Ballance, the author of the land tax of 1878, as premier, they repealed the Act of 1879 and passed the Land and Income Assessment Act in its stead.

Behind all the arguments against the property tax was the determination of the small proprietors to pay little or nothing in the way of direct taxes, but to make the wealthier people pay all. They also wished to break up the large estates, and in this they were strongly supported by the laboring class, who desired that they or their sons might occupy relatively improved and well-situated land instead of having to endure the hardships of pioneer life in the back blocks. Again, the small proprietors, who were mostly borrowers, wished to get at the money lenders by means of a tax on mortgages. Also, they used the arguments of single-taxers and other theorists in so far as it suited their purpose to do so, although the small farmers, who formed the backbone of the new democracy, were anything but single-taxers. A special tax was levied upon absentee landholders, who were thought to be a particularly undesirable class of citizens, and the income tax was designed to tax the wealthy mercantile, manufacturing, and professional people of the towns.

The original act¹ has been amended from time to time. The Consolidation Act of 1900 is now in force, with later amendments. The most notable features of the Act are the ordinary land tax, including the tax on mortgages on land, the graduated land tax, the tax on absentee owners, the graduated income tax, and the total exemption of small properties and incomes.

The ordinary land tax is assessed on the unimproved value, that is, the capital value less the value of all improvements. The Act of 1891 allowed deductions for improvements up to £3,000, but, by the amendment of 1897, the value of all improvements was exempted. The rate is fixed by the annual taxing act. At

¹Land and Income Assessment Act, 1891.

present it is 1d. in the pound on the unimproved value. Owners of land of which the unimproved value is £500 or less pay no tax.

The tax on mortgages on land was formerly the same as the tax on land, but in 1902 the rate was lowered to $\frac{3}{4}$ d. in the pound and has not since been changed. The tax is paid by the mortgagee, that is, the mortgagee and the mortgagor are treated as joint owners of the land. In making up the total assessed valuation on which an owner pays taxes, the amount of mortgages owing by him is deducted from the unimproved value, while the amount of mortgages owing to him is added thereto. If such net value is not over £500 the owner pays no taxes; if it is £1,500 he pays on £1,000 and there are diminishing exemptions up to £2,500, at which point the exemption ceases and the owner pays on the full unimproved value.

When the tax on mortgages was first imposed it was said that it would fall on the borrowers, since the lenders would charge a rate of interest sufficiently high to recoup themselves. Mr. Reeves states that such has not been the case,¹ but the tax was small and its effects were obscured by changes in the rate of interest due to other causes. From 1891 until about 1898 the rate of interest on mortgages declined, but afterwards rose. In the year 1898-99, about 58 per cent of the money lent on mortgages was lent at 5 per cent or less, but in the year 1906-7 only 53 per cent was lent at such rates. It seems probable that, if the tax had not been imposed, the rate of interest would have fallen more during the former period and would not have risen so high in the past few years. At the present time, which is a time of financial stringency, borrowers find it hard to get money either from the government or from private lenders, and the chambers of commerce of the Dominion seem to be unanimous in the opinion that the mortgage tax prevents capital from coming to New Zealand, and forces New Zealand capitalists to lend their money elsewhere.² Certainly, a good deal of New Zealand capital has been invested abroad in recent years.

The government is urged to abolish the mortgage tax and to

¹*State Experiments*, vol. 1, p. 261.

²*Evening Post*, Wellington, April 13, 1909.

make incomes derived from mortgages subject to the income tax. To do this would be to sacrifice some revenue and to discriminate against resident lenders, who could not evade the income tax, but the borrowers would probably gain more than the government would lose. For this reason it would be only fair to make them pay additional taxes on their land. The total revenue from the land tax, including the tax on mortgages, for the year 1907-8 was £537,846. For the year 1906-7 the revenue was £447,342, of which the ordinary land tax yielded £321,413 and the graduated land tax, including the tax on absentee owners, yielded £125,929.

The graduated land tax, which was designed chiefly to compel the large holders to sell or otherwise subdivide their estates, has recently been altered in the direction of increasing the tax on the larger holdings.¹ It begins with a tax of $\frac{1}{16}$ of a penny in the pound when the unimproved value in any assessment is not less than £5,000 and is less than £7,000, and increased by sixteenths to $\frac{13}{16}$ of a penny when the unimproved value is between £35,000 and £40,000. When the unimproved value is £40,000 the rate is suddenly increased to 8s. in every £100 (0.4 of 1 per cent), and for every additional £1,000 of unimproved value the rate is increased by $\frac{1}{5}$ of a shilling in every £100. The rate reaches its maximum at £200,000, when it is 2 per cent on the total unimproved value. For and after the year ending March 31, 1910, the progressive taxes on estates over £40,000 are to be increased by 25 per cent in the case of land other than business premises.

The total ordinary and graduated taxes paid by the owners of very large estates are now very heavy. An estate of which the unimproved value is £200,000, exclusive of business premises, pays a graduated tax of $2\frac{1}{2}$ per cent in addition to the ordinary land tax of 1d. in the pound (0.41 of 1 per cent), making 2.91 per cent in all. But the graduated tax is increased by 50 per cent in the case of absentee owners, so that the absentee owner of an estate of which the unimproved value was £200,000, if such an estate existed, would pay a tax of 4.16 per cent. By the Amended

¹An Act to Amend the Land and Income Assessment Act, 1900. October 26, 1907.

Act of 1907 a person is deemed to be an absentee "unless he has been personally present in New Zealand for at least one-half of the period of four years immediately preceding the year in and for which he is assessed for graduated land-tax."¹

The land tax, together with other legislation and the natural tendency toward the division of large holdings, a tendency not so strong in pastoral as in agricultural countries, has doubtless had some effect in reducing the size of the great estates. In the year 1896-97, 17.5 per cent of the holdings were of 320 acres and over and 90 per cent of the total acreage was thus held, while in 1907-8 such holdings were 20.94 per cent of the whole and comprised 87 per cent of the total acreage. These figures do not show any marked change, and it was not to be expected that they would, for an estate of 320 acres is a relatively small holding in a pastoral country like New Zealand. The great estates, however, show a considerable decline both in number and per cent of acreage. In 1896-97 there were 501 holdings of 10,000 acres and over, containing 54 per cent of the total acreage, and in 1907-8 there were 484 of such holdings, containing 44 per cent of the total acreage. In 1896-97 there were 112 holdings of 50,000 acres and over, comprising 30 per cent of the total acreage, while in 1907-8 there were only 84 estates of this class, comprising only 22 per cent of the total acreage.²

But some, at least, of these estates, instead of being broken up and sold to small holders, have been divided among the members of families, before or after the death of the owners, so that the power of these families remains almost as great as before, while the government loses something in the way of graduated tax. This loss has not been great, having amounted to only £9,153 in the ten years 1896 to 1906. The government has lost a good deal more by having purchased and subdivided certain large holdings, as the Cheviot estate. The total loss in graduated taxes that would have been paid had the estates remained intact has been estimated at £82,909 for the ten years from 1895 to 1905.³

¹7 Edw. 7, 1907, no. 18. *Year-book*, 1908, pp. 563, 669.

²*Year-book*, 1908, p. 469.

³Returns Presented to Parliament from the Land and Income Tax Department, B.-24b., and B.-24a., Session of 1905.

But the graduated tax was originally designed to break up the large estates, and when this work is accomplished the revenue which it now yields will have to be raised in some other way.

An official return presented to the House during the session of 1906 showed that there were 63 rural estates with an unimproved value of £50,000 and upward, 14 with an unimproved value of £100,000 and upward, one estate of 218,866 acres valued at £214,978, and one of 101,221 acres valued at £276,118. The capital value of these great estates was £296,990 and £335,405. During the session of 1906 the government brought in a bill to limit the holdings in rural land of any individual or company to an unimproved value of £50,000. The bill met with strong opposition and was dropped, and in the session of 1907 the act which has been described was passed, which, although condemned by some as a socialistic measure, has the merit of being logical and practicable, which could hardly be said of the previous plan. A return laid before the Council by the Valuation Department during the session of 1907 shows that there are no longer any estates in New Zealand having an unimproved value of £200,000 or over.¹

The taxation of unimproved values naturally brought about a radical change in the methods of valuing property, but before the year 1906 there was no uniformity in this matter. The Land and Income Tax Department periodically employed a small army of temporary valuers, and every local authority had its own method of making up its roll for the levying of rates. But on October 17, 1896, the Government Valuation of Land Act was passed (since amended several times), for the purpose of securing uniformity in valuation, particularly in the administration of the land tax and the rating on unimproved values.²

The Act provides for the appointment of a valuer-general and district valuers to hold office during pleasure. The district valuers reside in their districts, soon become expert in their work, and generally command the confidence of the people. There is little or no corruption or bribery. At first the valuation was

¹Return to an Order of the Legislative Council, dated July 26, 1907, no. 8.

²*Year-book*, 1908, p. 594.

about 10 per cent less than the true selling value, but presently much less, because of increase in land values. At present, however, the valuation seems to be rather high from the investor's point of view. The valuation is not made at stated times, but is constantly being revised, although it is sometimes out of date. The officials say that there are no insuperable difficulties in the way of determining unimproved values as distinguished from the value of improvements.

The Act of 1896 defined unimproved value as "the difference between the total capital value of the whole property and the total capital value of all buildings and improvements," but the definition was found to be inadequate, and the amendment of 1900 gives a number of more elaborate definitions, thus:

"*Capital value* of land means the sum which the owner's estate or interest therein, if unincumbered by any mortgage or other charge thereon, might be expected to realize at the time of valuation if offered for sale on such reasonable terms and conditions as a *bona fide* seller might be expected to require."

"*Improvements* on land means all work actually done or material used thereon by the expenditure of capital or labor by any owner or occupier of the land; nevertheless, in so far only as the effect of such work or material used is to increase the value of the land, and the benefit thereof is unexhausted at the time of valuation, but shall not include work done or material used on or for the benefit of land by the Crown or by any statutory public body, unless such work has been paid for by the contribution of the owner or occupier for that purpose; provided that the payment of rates or taxes shall not be deemed to be a contribution within the meaning of this definition."

"*Land* means and includes all land, tenements, and hereditaments, whether corporeal or incorporeal, in New Zealand, and all chattel or other interests therein, and all timber or flax growing or standing thereon; provided, that native bush or native trees which have been planted for shelter or ornamental purposes on an area not exceeding twenty-five acres shall not be included in the definition of land in this section."

"*Owner* means the person who, whether jointly or separately,

is seized or possessed of or entitled to any estate or interest in land."

"*Unimproved value* of any piece of land means the sum which the owner's estate or interest therein, if unincumbered by any mortgage or other charge thereon, and if no improvements existed on that particular piece of land, might be expected to realize at the time of valuation if offered for sale on such reasonable terms and conditions as a *bona fide* seller might be expected to require."

"*Value of improvements* means the sum by which the improvements on an owner's land increase its value; provided, that the value of improvements shall in no case be deemed to be more than the cost of such improvements estimated at the time of valuation, exclusive of the cost of repairs and maintenance."

The valuation of all the land and improvements in New Zealand was completed in 1898. The unimproved value was given as £84,401,244, and the value of improvements £54,196,103. In the year 1908 the unimproved value was £161,324,763 and the value of improvements £92,115,409. The valuation is useful not only as a basis for taxation but as a basis for the granting of loans and as a guide to all who desire to ascertain for any purpose the selling value of land.¹ However, the Advances to Settlers Office has its own valuers, and the work of the valuation department does not seem to be regarded as final, even by the government. Certainly, private lenders and purchasers do not blindly follow the government's valuation, but, on the contrary, the government seems to have too closely followed market values.

Of late years there has been a good deal of speculation in new lands, and speculative values have in many cases run ahead of permanent investment values, and the Valuation Department has been accused of encouraging speculation by overvaluing the land. In a recent debate in the House, Mr. T. Mackenzie said: "The tendency of the department has in recent years been in the direction of unduly increasing the unimproved value and undervaluing the improvements, which is entirely wrong, and against the spirit

¹ *Year-book*, 1908, sec. 20.

of the Act." Mr. Major said: "The unimproved value of land is always assessed at a higher rate than it should be, and the valuation for improvements is invariably too little. That is brought about by reason of the fact that there are certain improvements that are lost sight of, and are not visible to the eye of the average valuer. Some of the valuers are not sufficiently competent to assess the improvements at their true value."¹

There are several other reasons why the valuation tends to be too high. In the first place, the department wishes to make a high valuation in order to secure a large revenue from the land tax. Secondly, the government likes to show a high valuation because it is an indication of prosperity and strengthens the Dominion's credit in the loan market. Thirdly, owners like to have a high valuation when they come to sell their land or to borrow from the Advances to Settlers Office or from private lenders. Fourthly, if the owner insists on a low valuation, the government may purchase the land at the owner's valuation. True, the owner has, under the Act, the right to demand that the government purchase his land at the government's valuation, or to have his valuation reduced, but there may be reasons why an owner might not want to do this. At any rate, there has been little protest against the government's valuation until recently, when speculative values have fallen off and the land tax has become a burden. The government has promised to revise the valuation and it is probable that it will be considerably reduced.²

The income tax is complementary to the land tax, being levied upon incomes derived from sources other than land and mortgages on land. It is a graduated tax, with an exemption of £300 (\$1,458), which, however, is not allowed to absentees. Life insurance premiums on the taxpayer's own life are exempted up to £50. On the first £1,000 of taxable income, after allowing the exemptions, the rate is 6d. in the pound (2.5 per cent); on incomes in excess of £1,300 the rate is 1s. in the pound (5 per cent). For example, a person with an income of £300 would pay no tax; a person with an income of £1,300 would pay 2.5 per cent on

¹*Parl. Debates*, vol. 144, p. 427, August 26, 1908.

²*Evening Post*, Wellington, March 9, 1909.

£1,000; and a person having an income of £2,300 would pay 2.5 per cent on the first £1,000 and 5 per cent on the second £1,000. Companies enjoy no exemptions, and their incomes are taxed at the rate of 1s. in the pound, but friendly societies, building societies, savings banks, cooperative dairy companies, and charitable and educational institutions are wholly exempted from the income tax. No distinction is made between incomes derived from property and those derived from earnings.

The department is very strict in the administration of the tax, using an elaborate system of inspection and investigation and inflicting penalties for incorrect or fraudulent returns, so that there is very little concealment of incomes derived from investments in New Zealand. The tax on incomes from investments abroad could be more easily evaded. The yield of the income tax for the year 1907-8 was £304,905 (\$1,500,000).

Farmers complain that they are taxed more heavily than merchants and professional men, but, in view of the large profits which they have gained in recent years, and the great increase in the value of their land, they do not seem to have any serious grievance. Besides, although the land tax, when first imposed, may have been a considerable burden, later purchasers, allowing for the capital value of the tax, have paid less for the land than they would have paid if there had been no tax, and thus, in a sense, they pay no tax at all on the profits of farming. Again, profits in all kinds of business tend to equality, and no class of people except landowners can derive a permanent benefit from exemption from taxation. Also, the small farmers, as well as the small shopkeepers and all other people of small means, are wholly exempted from the land and income tax, which is paid altogether by the more well-to-do people, and of these the more wealthy pay the greater part of the taxes. The land tax, therefore, is quite different from the single tax proposed by Henry George, who would have society appropriate the whole rent of land, whether owned by large or small proprietors.

The success of the small proprietors in getting rid of the burden of taxes by substituting the land and income tax for the hated property tax was truly remarkable. In the year 1889 the num-

ber of taxpayers paying property tax was 26,327, or 4.3 per cent of the population (exclusive of Maoris). In the year 1892-93 there were 12,360 persons paying land taxes and 3,448 paying income taxes, making in all 15,808 taxpayers, or 2.5 per cent of the population. In fact, the number of taxpayers was somewhat less than this, since some persons paid both land and income taxes. In the year 1889 there were 2,242 persons under the class "working storemen, mechanics, laborers, shepherds, etc.," who paid in property taxes £4,053; in the year 1892-93 there were only 249 persons in this class, paying only £543 in land and income taxes. In the year 1889 there were 3,156 persons in the class "tradesmen, wholesale and retail shopkeepers, etc.," paying £14,721, and 8,611 persons in the class "graziers, sheepfarmers, etc.," paying £81,544; in the year 1892-93 there were 1,809 persons in the former class, paying £11,978, and 5,883 persons in the latter class, paying £89,341. In the year 1889 the property tax yielded £354,167; in the year 1892-93 the land and income tax yielded £374,088.¹

The number of persons paying land and income taxes has increased both absolutely and relatively since 1893, because of more careful administration and because of the increase in wealth of a considerable class of the people, formerly struggling farmers and shopkeepers. In the year 1907-8 there were 28,991 persons paying land taxes, out of 150,000 freeholders and 24,179 Crown tenants. In the same year there were 10,420 persons paying income taxes, making in all 40,411 taxpayers, or 4.3 per cent of the population, paying in all £842,751. In the session of 1903 a return was laid before the House showing that out of 115,713 landholders only 15,864 paid any land tax at all, while of these 9,287 paid less than £5 apiece, so that by far the greater part of the taxes were paid by 6,577 landholders.² The same condition prevails at the present time. The number of persons paying direct taxes is very small compared with the total population or with the number of voters, and to this may be traced much of the

¹Report by the Commissioner of Taxes, C. B. Crombie, July 28, 1893. Year-book, 1893, p. 425.

²Landholders and Land Tax, 1904 B. 20.

laxity in public expenditure characteristic of the democracy of New Zealand. Back of this inequality in the payment of taxes lies, of course, a corresponding inequality in the distribution of wealth.

STAMP DUTIES

A large revenue is raised by means of stamp duties, amounting to £585,465 in the year 1907-8. These taxes are paid upon a great variety of instruments, including affidavits, agreements, annual licenses of companies, assignments, bills of exchange, promissory notes, bank notes, bills of lading, sea insurance policies, certificates of incorporation, conveyances, deeds, receipts, transfers of shares, letters of administration.

The duty on receipts is 1d. (2 cents), irrespective of value received. The duty on transfer of shares begins with a duty of 1s. (24 cents) when the purchase money does not exceed £50 (\$243); when it exceeds £20 and does not exceed £50 the duty is 2s. 6d. (60 cents); for every additional £50 the duty is 2s. 6d. Upon any transfer of shares not an actual sale the duty is 10s. (\$2.40). These duties are obviously intended to discourage speculation in shares.¹ The duty on bank notes is equal to one-half of 1 per cent upon the average quarterly circulation. The maker of a promissory note pays a duty of 6d. (12 cents) for any sum not exceeding £25, 1s. for any sum exceeding £25, and not exceeding £50, and 1s. for every additional £50 or part of £50. The duty on bills of lading is 1s., paid by the consignee. The duty on leases is 2s. 6d. when the yearly rent does not exceed £50, and 2s. 6d. for every additional £50.

A considerable revenue is derived from licenses granted to racing associations and other users of a betting machine called the totalisator. The duty is 1½ per cent upon the gross takings. In the year 1907-8 the total takings of the totalisator were £1,999,757, and the government's share was £29,996 (\$145,000).²

An important source of revenue is the progressive tax on the

¹ An Act to Consolidate and Amend the Laws Relating to Stamp Duties, 1882.

² Stamp Acts Amendment, 1891. *Year-book*, 1908, p. 638.

estates of deceased persons, which is high, rising to 13 per cent in the case of large estates left to strangers in blood. The duties are levied according to the following schedule:

1. When the value does not exceed £100.....	No duty
2. Upon any amount exceeding £100 but not exceeding £1,000—	
On the first £100	No duty
And on the remainder	2½ per cent
3. Upon any amount exceeding £1,000 but not exceeding £5,000	3½ per cent
4. Upon any amount exceeding £5,000, and up to £20,000....	7 per cent
5. Upon £20,000 and any amount over that sum.....	10 per cent
6. Strangers in blood, excepting adopted children.....	3 per cent additional

Property left to husband or wife of the decedent is not dutiable. The duties apply also to deeds of gift, so that persons of wealth can not legally evade the tax by giving their property to their heirs before their death. Such transactions are very carefully watched, and there is very little evasion of the duties, which yield about £250,000 (\$1,250,000) a year.¹

It is impossible to estimate exactly the revenue derived from stamp duties; for in some cases, as in affixing stamps on receipts, ordinary postage stamps are used, and the revenue from the sale of these is counted as part of the revenue of the Post and Telegraph Department.

The people of New Zealand are very much taxed, notwithstanding the fact that the government carries on a number of enterprises which one would think should yield a profit and so afford relief from taxation. But these governmental enterprises are not managed so as to earn profits, and in some cases they result in a deficit. The railway deficit for the year 1907-8 was about £230,000 (\$1,017,000), about twice the revenue derived from the beer duty. The interest on the net public debt, that is, the gross debt less the value of productive investments, was about £1,000,000 (\$486,000), more than enough to eat up the entire revenue from the land and income tax. Then there is the sum of £330,802, given to the aged poor in the form of pensions, which

¹An Act to Enforce and Collect Duties on the Estates of Deceased Persons, 1881. Amendment Act, 1885.

is about two-thirds of the revenue from the stamp duties. There has also been some extravagance in the public administration, due chiefly to the prosperity that has prevailed during the past ten years. Finally, there has been for some years a large surplus of revenue over expenditure, most of which has been transferred to the Public Works Fund, chiefly for public buildings, roads, and bridges.

It is possible, and even probable, that there will be reform in public expenditure in the near future. The government has lately announced its intention to try to make the railways pay at least the interest on the capital cost. It is possible that the unproductive part of the public debt may some day be paid off and the enormous burden of interest be thereby taken away. The government has recently proposed a drastic system of economics in the civil service, which, as Sir Joseph Ward said, "will effect a total saving exceeding a quarter of a million sterling (\$1,200,000), and this, so far as the portion affecting the public service is concerned, without impairing its efficiency or inconveniencing the public in any way."¹

But it is not at all likely that these or other economies will bring relief to the taxpayers. There may be a larger surplus to spend on roads and bridges, or some of the public debt may be paid off, or the amount expended on old-age pensions may be increased, but it is not likely that taxes will be diminished, for the political power has for the most part passed away from the wealthy class, who pay most of the taxes, into the hands of a democracy of relatively poor people who are now taking their turn at exploiting the rich, and regard the capitalist as a cow to be milked or a goose to be cherished for the sake of its golden eggs.

B. LOCAL TAXATION

The revenue of the cities, boroughs, counties, road boards, and other local governing bodies is derived only in part from taxation. In the year 1906-7 their total revenue was £2,812,440, of which £192,932 was received from the general government,

¹Speech of Sir Joseph Ward at Upper Hutt, April 2, 1909. *The Press*, Christchurch, April 3.

£1,386,459 from licenses, tolls, rents, and other sources, and £1,233,049 from rates. Of this amount £889,716 consisted of general rates, and £343,337 special and separate rates, for water and other special purposes. The sum of £79,593 was raised by licenses, and £25,894 by other taxes, making £1,338,536 altogether, which sum is equivalent to £1 9s. 8d. (\$7.18) per head of the European population. Since the total of general and local taxation is equal to £6.5 (\$31.59) per head of the European population, the local taxes are only about one-fourth of the total. The relative unimportance of the local bodies is largely due to the fact that the system of public instruction is wholly supported by the general government, at a cost of £843,311 in the year 1907-8. The general government also grants large subsidies to the local bodies.¹

Before the year 1896 rates might be levied upon the capital value or the annual value of real estate, at the option of the local authorities. The Rating Act defines *annual value* of property as "the rent at which such property would let from year to year, deducting therefrom twenty per centum in the case of houses, buildings, and other perishable property, and ten per centum in case of land and other hereditaments, but shall in no case be less than five per centum of the fee-simple thereof." *Capital value* is defined as "the sum at which the fee-simple of any ratable property, if held in possession free from incumbrances, is assessed."² The system of rating on annual value is preferred by most of the boroughs, while the counties usually levy on the capital value.

The passage of the Land and Income Assessment Act of 1891 called the attention of the local bodies to the possibility of a third form of rating, the rating on unimproved values, which had been strongly urged by the followers of Henry George. Besides, there were the usual objections to the existing methods of rating, and there was a certain amount of speculation in land, which in some places was withheld from sale and kept unimproved in anticipation of enhanced values. The laboring class, too, complained of

¹ *Year-book*, 1908, p. 299.

² An Act to Consolidate the Law for Regulating the Making and Levying of Rates. October 9, 1894.

high rents. Also, the proposed Government Valuation of Land Act, passed on October 17, 1896, promised to give the local bodies a basis for taxation without expense to them. For all of these reasons, but largely through the activity of a few "single-taxers," the Rating on Unimproved Value Act, of August 13, 1896, was passed, giving the local bodies a third option in regard to the basis on which rates might be levied. The bill was first introduced as part of the General Rating Bill in 1893, and then as a separate bill in 1894, 1895, and 1896, in which last mentioned year it was finally passed. In every case the Upper Chamber was responsible for its rejection. One of the most interesting points in the debates was the strong country element among the advocates of the bill. It might have been thought that, if the measure was to be regarded as a step towards single tax, it would have excited unbounded hostility from the rural constituencies. On the contrary, many of the best speeches in support of the bill came from rural representatives, and some of the best in opposition to it came from the city and borough members. Several speakers who championed the bill strongly disavowed any leanings towards what one of them called "that infamous proposal, the single tax." Needless to say, the bill was heartily supported by the few single-taxers in Parliament. Mr. O'Regan enthusiastically declared that "even Henry George himself could not have drafted a more logical bill than this." A good deal of reliance was placed on the fact that a similar act had been passed in Queensland in 1890. Indeed, one industrious historian unearthed the interesting discovery that under an old provincial ordinance in Taranaki in 1858 rating on unimproved values had there been in operation for many years. The ordinance stated that "within the town district an uniform rate per cent to be assessed on the value of all lands within the district, exclusive of all buildings, erections, and improvements whatsoever, shall in every case be imposed, such value to be ascertained as hereinafter provided." This ordinance was in operation for many years before Henry George became an influence in the colony. Since this form of taxation is a partial application of the principles of Henry George, it is of more than local interest and deserves more than passing notice.

RATING ON UNIMPROVED VALUES

The Act provides for local option in taxation, in that boroughs, counties, town districts, road districts, and other rating bodies may decide as to whether their rates shall be levied on the unimproved value, as determined by the government's valuation, or upon the annual or capital value of real estate as formerly. A written demand, signed by from 15 per cent to 20 per cent of the ratepayers, according to the number of ratepayers in the rating district, must first be presented to the chairman of the district, requesting that the Act be submitted to a vote of the ratepayers, and the vote must be taken between twenty-one and twenty-five days after delivery of the demand.

Under the original act it was necessary for at least one-third of the ratepayers to vote, and a majority of their votes carried the proposal. Because of this provision the Act failed to be carried in a number of districts, but now the Local Government Voting Reform Act of 1899 provides that a bare majority of the valid votes recorded is sufficient to adopt the Act. If the Act is adopted, no rescinding proposal can be submitted to the ratepayers until the expiration of at least three years, and if a rescinding proposal is carried no adoption proposal may be submitted until after three years have elapsed.

Section 20 of the Act reads as follows: "This act shall not apply to water rates, gas rates, electric-light rates, sewage rates, or hospital and charitable-aid rates." The reason for the exclusion of these rates was that, as they represented service to buildings alone, they should be exceptional rates and be levied upon the gross value and not on the unimproved value.¹ In committee Mr. O'Regan, an ardent single-taxer, moved an amendment having for its object the levying of these exceptional rates on the unimproved value, but this was lost by a large majority.

A similar attempt was made during the parliamentary session of 1905, when a bill was introduced into the House by Mr. Henry George Ell to amend the principal act so as to permit the local authorities to levy "all or any of the rates mentioned in sec. 20

¹*Parl. Debates*, vol. 85, p. 192, 1896.

upon the unimproved value." This proposal excited great opposition and a spirited debate, and the bill was lost. It shows, however, that the single-taxers of New Zealand are not satisfied with the small measure of land taxation which they have secured, and that they favor local option only as a means to an end, and, if possible, would make rating on unimproved value not optional but mandatory in every rating district in the Dominion.

Up to May 15, 1899, the Act had been submitted to the ratepayers in 23 districts, and in 21 cases received large majorities, the minorities in most cases being remarkably small. In 8 cases less than one-third of the ratepayers voted, and the Act was rejected, but in all of these districts it was carried at a later date. Up to March 31, 1906, the Act had been rejected by 12 districts and adopted by 69, including 2 cities out of a total of 4, 19 counties out of 97, 38¹ boroughs out of 97, 9 road districts out of 214, and one town district out of 32. In the year 1904 the Act was carried by 6 districts and rejected by 1; in 1905 it was carried by 6 and rejected by 6; in 1906 it was not voted on in any district; in 1907 it was carried in 4 districts and rejected in 2. On March 30, 1908, the borough of North-east Valley, which had adopted the Act on January 12, 1905, by a vote of 202 to 172, voted to rescind by a vote of 354 to 185. This is the first case of rescission, although three other proposals to rescind have been made, and in two cases a strong opposition was developed. In the third case

¹The boroughs represent the class of local bodies in which the evils of land speculation are most felt. Their populations range from a few hundred to 10,000. They come midway in the scale of local bodies. They are neither purely rural nor purely urban. Their improvements constitute a greater percentage of their value than do the improvements in the rural districts. At the same time these improvements are not uniformly distributed. The boroughs contain many vacant sections—sometimes held in blocks for a rise in value—sometimes held as grazing paddocks. Hence, in the boroughs, the evils of land speculation press on the notice of even the casual passer-by who may never have heard of the doctrines of Henry George. At the same time it is in the boroughs that cases of hardship most frequently occur. Some market gardener or small dairy farmer finds himself confronted with increased rates, while he himself is void of offense so far as concerns the evils against which the system is ostensibly directed. These two considerations account to some extent for the large number of boroughs which have voted, and also for the rejection, in some cases, of the proposal. No doubt, also, the concentration of population as compared with the counties makes it easier to obtain a vote.

the vote on both sides was less than when the Act was carried. The vote is seldom a large proportion of the total ratepayers.

The indifference of many ratepayers to the rating on unimproved values is probably due chiefly to the fact that the rates in most districts are not a heavy burden upon the owners of property. The general government supports the public schools and many charitable institutions, spends large sums of money on roads and other public works, bears the expense of valuation, and even grants subsidies to the local bodies. The chief items of local expenditure are for roads, bridges, drainage, harbors, charitable aid, and hospitals. Besides, over half of the local revenues are derived from licenses, rents, governmental subsidies, and other sources. In the year 1906-7 the total revenue from rates in all the local bodies was £1,233,049, and of this amount only £889,711 was derived from the general rates, which are practically the only rates that can be levied upon the unimproved value. In the same year the total unimproved value was £149,682,689, so that the total general rates were only 0.6 of 1 per cent of the total unimproved value. In counties and small boroughs the rates are low, but much higher in the larger towns. In Wellington the general rate is 0.83 of 1 per cent of the unimproved valuation, in Christchurch (Central Ward) 1.2 per cent, in Invercargill 1.2 per cent, in Devonport 0.6 of 1 per cent, in Stratford 1 per cent, and in North-east Valley 1 per cent. These figures show clearly that the rating on unimproved values is by no means a thorough-going application of single-tax principles.

On April 5, 1906, the Secretary of State of the British Government sent the following telegram to the governors of New South Wales, South Australia, and New Zealand: "Please send home, as soon as possible, any reports or other information available as to the working of taxation on unimproved land, both for municipal and State purposes. Information especially desired as to effects of land value taxation on building trade, on rent, on incidence of taxation on house property and vacant sites respectively, and on land speculation.—Elgin."

In compliance with this request the New Zealand government sent a circular to all local authorities rating on the unimproved

value, asking for a report on the lines required, and 52 replies were received. A digest of the reports was made and forwarded to the British government on July 9, 1906, together with a memorandum on the subject by Mr. P. Heyes, the Commissioner of Taxes. This, with the reports from South Australia and New South Wales, was published as a blue-book by the British government in November, 1906.¹

Of the 52 replies received about 38 were fairly satisfactory, but only a few covered all the points about which information was requested. The following is a rough classification of the replies:

1. There is a general agreement that rents have not been reduced, and that the incidence of taxation has been changed, so as to fall more heavily upon unimproved land and upon land on which there are improvements the value of which is less than the unimproved value. Out of 11 opinions concerning the justice of this change of incidence, 4 say that it is more equitable, while 7 say that it is unjust or onerous.

2. As to speculation in land, 15 replies say that it has been discouraged, and only 1 holds the contrary opinion, while 3 say that vacant sites have been broken up and put upon the market.

3. As to the building trade, 12 say that it has been encouraged, 8 think that it has not been affected, 1 says it has been discouraged, and 1 holds that it has been unduly stimulated to the point of overcrowding.

4. Out of 25 replies expressing opinions as to the general popularity of the system, 20 say that it is satisfactory or beneficial, and 5 say that it is not so.

On the whole, the replies were not very satisfactory, perhaps because the questions were not sufficiently specific, but more probably because of the difficulty of forming a just opinion of the effects of such legislation or even of the state of public opinion on the subject. Besides, the replies show a tendency to theorize, and in many cases represent merely personal opinions of the officials as to the effects that might be expected to follow the intro-

¹Papers relative to the Working of Taxation of the Unimproved Value of Land in New Zealand, New South Wales, and South Australia. London, 1906.

duction of the new system. This is markedly true of the memorandum of Mr. Heyes, who seems to interpret the facts from the viewpoint of a confirmed single-taxer. However, Mr. Heyes is in a better position to observe the effects of the system than the town clerks or other local officials, and his opinion must be accorded much weight. Summarizing the results of the investigation, he says: "*In the large majority of cases* the system has been only a short time in force and in these cases no opinion is expressed as to the merits or otherwise of the system. It is extending more rapidly as the effect is seen in the places where it is adopted and it becomes better understood. The reports, as will be observed, show the results to have been beneficial. From the reports received, and the most reliable sources of information available based on personal observation and inquiry, I am of opinion that the effect of the system of rating on the unimproved value would be correctly summarized on the lines required as follows:

"Building Trade: The effect has certainly been to greatly stimulate the building trade. The object and tendency of this system of taxation is to compel land being put to its best use, so that the greatest amount of income may be derived from it, and rendering it unprofitable to hold land for prospective increment in value. It has been the direct cause of much valuable suburban land being cut up and placed on the market and thus rendered more easily available for residential purposes, and of the subdivision of large estates in the country, resulting in closer settlement.

"The effect on urban and suburban land has been very marked. It has compelled owners of these to build or sell to those who would—it has thus caused a great impetus to the building trade. An owner of land occupied by buildings of little value, finding that he has to pay the same rates and taxes as an owner having his land occupied by a valuable block of buildings, must see that his interests lie in putting his land to its best use. The rebuilding of this city (Wellington) which for some years past has been rapidly going on is largely attributable to the taxation and rating on land values, so that the supply of building materials could not at times keep pace with the demand.

"Rent: The tendency of this system of taxation is not to in-

crease rent, but, on the contrary, as the tax becomes heavier, it tends to bring into beneficial occupation land not put to its best use and *so reduces rent*, the improvements being entirely free from all rates and taxes. In *some cases* where land suitable for building sites is limited high rents have been maintained, notwithstanding the tendency of the system.

"Vacant Sites: The effect has been to cause vacant sites being put to their best use by expenditure on improvements. On vacant sites the rates and taxes are increased and continue to increase as the adjacent sites which have been improved increase in value. It thus becomes unprofitable to continue to hold land unimproved.

"Incidence of Taxation: The taxation, on building property, where the improvements exceed the unimproved value, is decreased; where the unimproved value exceeds the improvements the taxation is increased.

"Land Speculation: The tendency is to discourage speculation as the tax partially or wholly discounts the rise in value, but land speculation has not ceased in some districts where the system has been adopted, because:

"(1) The tax has not been sufficient to render speculation unprofitable in the large cities, though it has been a factor to be reckoned with.

"(2) The rapid increase in values has caused speculation in spite of the tax.

"In my opinion the exemption of all improvements (in conjunction with the Lands for Settlement and Advances to Settlers policy of the government) has to a large extent contributed to the solid prosperity of the Colony."

Before the government's report was accessible the present writers made a similar investigation by means of a series of questions sent, in December, 1906, to the clerks of all the local bodies, 69 in number, that had adopted the Act. Forty replies were received, of which 35 gave fairly satisfactory answers. The questions and a summary of the replies are here given:

1. Has the system had any marked effect in discouraging the holding of land for speculative purposes? Yes, 12; no, 19; indefinite, 4.

2. Has the system unduly forced people to part with land used for private gardens? Yes, 4; no, 22; indefinite, 9.

3. Do you attribute to the system any alteration in the prosperity of your county, district, or borough? Yes, 7; no, 22; indefinite, 9.

4. Has the system caused any appreciable increase of buildings or other improvements? Yes, 12; no, 14; indefinite, 9.

5. Has the system caused buildings to be erected in advance of requirements? Yes, 3; no, 32.

6. (a) Do you consider the system to work equitably? Yes, 19; no, 9. (b) Do you know of any cases of hardship? If possible, give details. Yes, 14; no, 10.

7. Has it had any effect in (a) cheapening land, or (b) making it easier to get? (a) Yes, 5; no, 28. (b) Yes, 12; no, 22.

8. Do the ratepayers and public seem satisfied with the system? Yes, 22; no, 3; indefinite, 10.

In further explanation of these questions and answers it should be noted:

1. The tax is too slight to have any marked effect in discouraging speculation, especially in view of the general rise in land values, but in a number of cases weak holders have been compelled to sell to stronger holders, or to buyers of small lots for building.

2. In a few places, as in Wellington, where there is a great scarcity of building sites, the tendency already existing toward overcrowding has been increased. A higher tax would have a still greater effect in this direction. It is indisputable that since its inception there has been a continual process of cutting up gardens, concentration of buildings, and increase of slum areas. The rapid increase of land value has undoubtedly largely contributed to this result. But it seems equally clear that the new system of rating has been a contributing factor. This was clearly foreseen by the present Chief Justice (Sir Robert Stout), who led the opposition to the bill in Parliament. He predicted that the effect of the bill would be to do away with the vacant spaces—with the lungs of the cities. He emphatically declared that, while in other lands reformers were struggling to get open spaces, this proposed

legislation would lead in exactly the opposite direction in New Zealand.

3. The prosperity of New Zealand is chiefly due to the natural resources of the country, as yet only partially developed, and to the high prices for mutton, wool, and dairy produce that have prevailed during the past ten years. The effects of the land-legislation have therefore been obscured. The policy of the government in encouraging closer settlement has doubtless contributed to the development of the country, but the rating on unimproved value has probably had little, if any, effect in promoting or retarding general or local prosperity.

4. The increase of buildings and other improvements has been due chiefly, if not altogether, to the general prosperity of the country, and the consequent increase of population. Districts where the old system of rating has been retained have prospered as much as the others. From 1901 to 1906 the population of New Zealand, exclusive of Maoris, increased by 15 per cent. The cities of Wellington and Christchurch, where rating on unimproved value is in force, increased by 25 per cent and 18 per cent respectively, while the city of Auckland, which has kept to the old system, increased by 22 per cent. Two of the suburbs of Auckland, Devonport, and Grey Lynn, under the new rating, have increased by 35 and 43 per cent respectively, yet the more conservative suburbs of Remuera, Mount Albert, and Epsom show gains of 42, 75, and 112 per cent. Karori and Onslow, suburbs of Wellington, which adopted rating on unimproved value in 1898 and 1901, have increased by 42 and 82 per cent, while the suburban boroughs of Petone and Miramar, which did not adopt the new rating until 1905, have increased by 56 and 95 per cent. The borough of Invercargill, which adopted the Act in 1901, has increased by 16 per cent, and the borough of Invercargill South, under the old rating, has increased by 22 per cent. The boroughs of Waimate and Hamilton, where the new system has been in force since 1901, have increased by 20 and 75 per cent, yet the boroughs of Timaru and Gisborne, with the old rating in force, show gains of 18 and 108 per cent. The total population of the 21 boroughs which adopted the Act before 1904 shows an increase of 24 per cent.

while the total population of all the boroughs in New Zealand has increased by 22 per cent. The total population of the 10 counties where the Act was adopted before 1904 has increased by 10 per cent, and the total county population of New Zealand has also increased 10 per cent in the same time. So there is no evidence to show that the rating on unimproved value has either advanced or retarded the growth of the districts in which it has been adopted.¹

5. The tax is not sufficient to stimulate building to any marked extent, but if it were, and a large number of people improved their land for the sake of securing some revenue, and not in response to increased demand, rents in general would fall, and the owners of improved property would lose as much as they had gained by exemption from taxation, or more. At the same time the propertyless class would gain by the reduction of rents.

6. The question of equity in the majority of cases has transformed itself into a question of the interests of the several classes concerned. There are two classes of owners: those whose unimproved value is much greater than the value of their improvements, and those who own a relatively greater value in improvements. Owners of the latter class are well satisfied with the rating on unimproved value, since it has reduced their taxes. Owners of the former class complain when their taxes are materially increased, but since land values have risen almost everywhere, most of these people have lost nothing and feel no great burden unless they are holding large quantities of unimproved land. There are many individual cases of hardship, as where a poor person in a borough has a large vegetable garden or a paddock for a cow. Some industries, too, such as lumberyards, foundries, and dairies, situated within a borough, have had their taxes greatly increased, and have been compelled to move to the country, where land is cheap. Not infrequently people owning large houses built upon small lots have had their taxes reduced, while some of their poorer neighbors have paid more. As a rule, however, a large house is built upon a large piece of land and a small house upon a small allotment. Moreover, rich people as a rule own more unimproved land than poor people. Therefore

¹Census of 1906.

the adoption of the new system involves a shifting of the burden of local taxation from the many to the relatively few, and those few, in a progressive community, are usually those best able to bear it. In a stationary or declining community the case might be quite different.

Where the system has been adopted in counties containing towns, the taxes on rural property are relatively increased and those of town property relatively decreased; so that the country people complain and demand a system of differential rating, or a separation of the towns from the rural districts for purposes of rating. Again, in rural districts the rates fall more heavily upon the holdings of new settlers than upon the improved holdings of their more prosperous neighbors.

7. Land values have risen greatly, notwithstanding the tax. This, together with the slight amount of the tax, is probably the cause of the general indifference of ratepayers to the question. There is still a great deal of speculation in land, and land values are probably too high, in view of a possible and even probable fall in prices of mutton and wool because of increasing competition on the part of Australia and Argentina.

8. Many of the ratepayers, if not a majority, have had their rates reduced and are well satisfied with this result. Many others are indifferent. The working class, who are interested in the securing of lower rents, are largely in favor of rating on unimproved values, but only those who own property can vote on the question. Town clerks are inclined to favor the system because, if adopted for all rates, it would permit of a simplified system of bookkeeping. The minority who suffer hardship do not seem to have sufficient influence to have the system abolished.

The case of North-east Valley is of particular interest since it is the only district that has adopted the system and afterward abandoned it. The borough has a population of 4,467. It adopted rating on unimproved values on January 12, 1905, and voted for rescission on March 30, 1908. In reply to the government's circular, the borough reported as follows: "Decreases rates on buildings. Increases rates payable on land. Encourages building operations. Attracts population. Does not materially

reduce rents. Oppresses holders of land unsuitable for building. Discourages land speculations. Reduces number of vacant sites." In reply to the writers' circular the answers were, in brief: "Discourages speculation in land. Forces people to sell private gardens and other land. Has increased prosperity, causing a large increase of building and influx of population. Has not unduly stimulated building, but there is danger of this. Is hard on the farmer. Differential rating should be allowed. It has made land cheaper and easier to get. The majority are eased and therefore satisfied. The minority feel the additional burden."

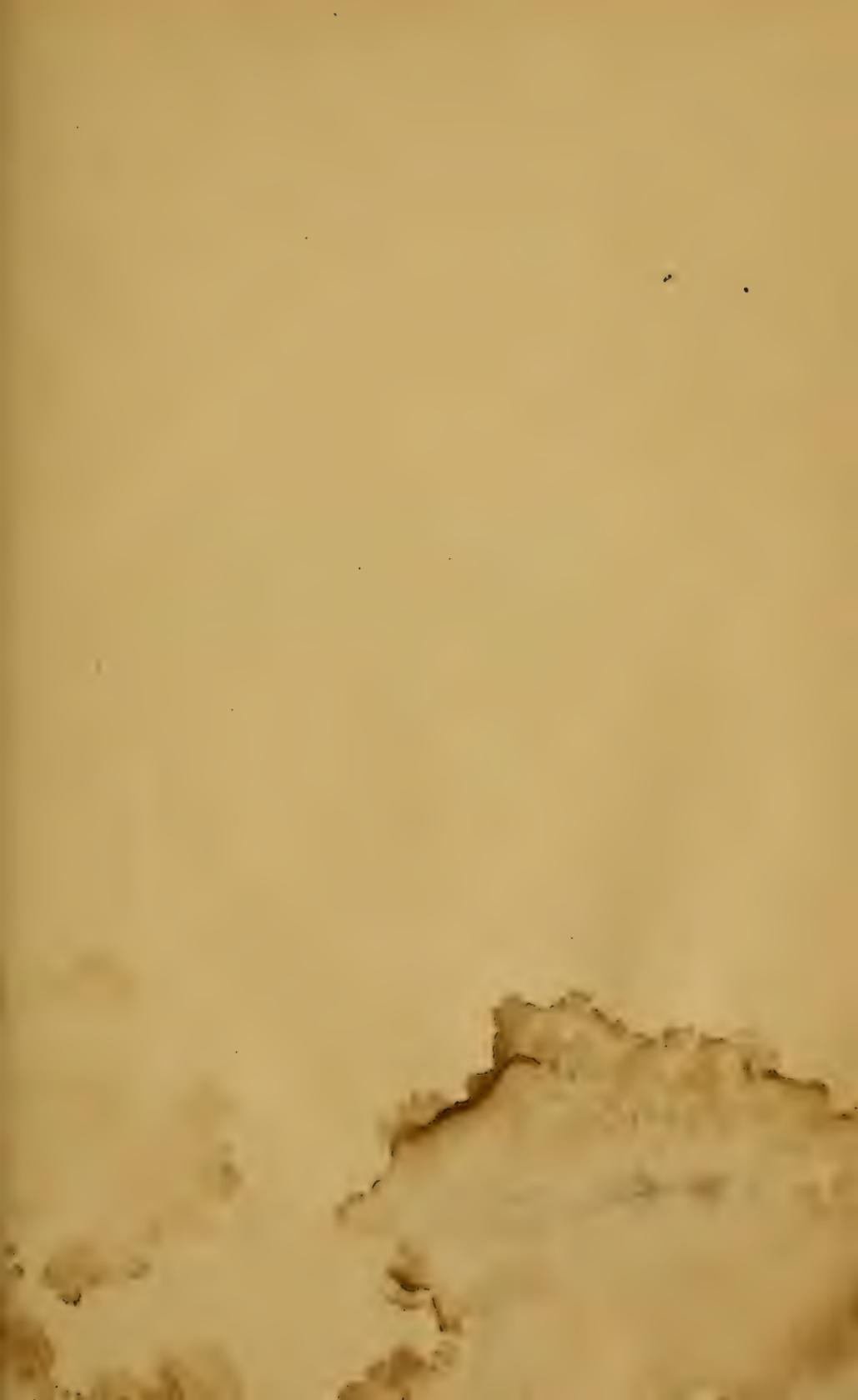
A number of people in New Zealand, particularly the followers of Henry George, give a glowing account of the success of rating on unimproved values wherever tried. The Hon. George Fowlds, Minister of Education, holds that the land taxes, both general and local, have been among the chief causes of the prosperity of the Dominion during the past ten or twelve years. Mr. Ell, M. H. R., is strongly in favor of the new system, and would have water rates, gas rates, and all other rates, general and special, levied upon the unimproved value. Mr. George Laurensen, M. H. R., said in the House: "I can assure you that the rating on unimproved values system will yet be adopted by every municipality in New Zealand. In the next ten years it will be adopted in connection with every class of rates that may be levied in this Colony."

But the facts do not seem to warrant optimistic conclusions such as these. The benefits of rating on unimproved values are not so obvious as to command unanimous approval or to persuade all the rating districts to adopt it without delay. The opposition to the system appears to be growing stronger as people are coming to recognize its relation to the propaganda for single-tax. The small landowners like to shift the burden of taxation from their own shoulders to those of their wealthy neighbors, but they are strong supporters of freehold tenure and will not readily consent to have their property confiscated by any radical extension of the principle of taxation of unimproved values.

The growing political power of the laboring class, for whose benefit much of the recent legislation of New Zealand has been

enacted, may ultimately bring about the nationalization of land, but surely not until the Dominion has become an industrial nation, rather than a pastoral and agricultural community as it is today. Up to the present time the effects of rating on unimproved values have been insignificant. The most notable feature of the system is the shifting of the burden of local taxation from one class of taxpayers to another. It is an interesting phase of the tendency which prevails throughout Australasia toward an equalization of wealth by means of a legal transfer of the property of the wealthier classes to the pockets of their poorer neighbors. How far this process will go it is impossible to foretell, but that its ultimate results will be beneficial to the majority of the people is by no means certain.

Viewing the New Zealand system of taxation as a whole, it is seen to be more like European than American systems in that it derives large revenues from income taxes and stamp duties, sources generally neglected in the United States, except in time of war. No doubt the New Zealand system is well adapted to the conditions of the country, and the only serious criticism that could be made is that too much is taken from the taxpayers and too little returned to the people in the form of social benefits. That the taxpayers' burdens will be reduced does not seem at all likely, but that economy in expenditure will increase the sum total of social benefit may at least be hoped.



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THREE LONDON THEATRES OF SHAKESPEARE'S TIME.

By Charles William Wallace.

I

NATURE OF THE NEW DOCUMENTS.

The records presented in the following pages came into my hands in the natural course of research conducted in European archives by myself and wife the past few years, resulting in a series of similar discoveries on the stage and drama of Shakespeare's time. They belong to the Court of Requests, of the reign of James I, and are preserved in the Public Record Office at London, the great national archives of England, where are admirably kept the most varied and extensive sources of history in existence.

The pleadings of this branch of equity for the period in hand are uncalendered, or unindexed, and have lain unexamined for three hundred years. They were prepared by the officials for inspection upon my request. Skins, or parchments, ranging from twelve or fifteen square feet to occasional scraps an inch wide, compose the chief bulk of the proceedings. Most of them are as large as a sheep-skin would cut to straight edges, and the finely written lines run the entire width of the skin. Depositions, re-

ports, &c., are on heavy hand-made paper. All, except the miscellaneous books, have long been well and cleanly preserved in great canvas-covered bundles nearly three feet square. When they were prepared for my examination, the fine old bundles, because of the difficulty experienced by the office in handling their great bulk and weight, were broken up into two or three parts each. Some of the documents are mouldered, rotted away in places, or matted together from damp and parasitic diseases peculiar to archives, while others are not only as perfect as the day they were written, but have acquired that additional beauty which comes only from the tone of time. The condition of the present collection is sufficiently indicated below.

It is often thought that the finding of valuable materials in such masses is a mere matter of chance or "luck." The preposterousness of such a notion would be demonstrated at once to any one who should attempt research upon such a basis of mere haphazard. Out of the hundreds of archives, you must, upon sure information, determine whether you will search in the one or the other, and in following out a system, you will find yourself led, as I have been, first into one, then another, and another. Once in, you must know what class of documents to search. For example, at the Public Record Office alone, there are some thousand classes and sub-classes of documents. The same conditions, on a smaller scale, exist in the other archives. Out of all these you must, by some definite information or clue, determine in what class the records lie that will give the information you desire. A chance result may, of course, come to any one, just as has been the case in this very field. But chance cannot be depended upon. A continued series of results is achieved, not reached by a hand thrust at random into the dark.

In my own researches, neither the present discoveries nor any others have been the result of accident, or chance, or "luck." They have come from severer, surer methods. I was led into this particular class of records, just as I have been led into all others, in following out definite clues in a rigorously scientific and systematic course of research. It is comparatively easy to examine any class of records after you know where and what

that class is, and what to hunt for. But one might search a life-time, as many illustrious men, some of them my predecessors, have done, without finding any of these. It looks all very simple after it is done. And it is simple,—after it is done,—as illustrated by the famous story of standing an egg on end.

I may add that we have examined every document preserved in the Court of Requests for the period in hand, and are able to report that the following are the only records that still exist there in the cases of *Woodford vs. Holland*, *Smith vs. Beeston*, and *Alleyn vs. Henslowe*.

The contemporary records now presented reedify three old London theatres of Shakespeare's time, revivify their owners and actors, and make us see and realize and share in the existence of each, as if we were of and in and properly belonging to that long past that was just as real and just as human as our own present. These old theatres were not things of romantic wonder, nor were the actors glorified beings that trod the boards with god-like movement and divine passion. Both were as real and as common as life and its means of existence. Partly from their contemporaneousness with Shakespeare and partly for their own sakes in a revered past, the dramas that first spoke to the little audiences from the lips of these actors, and from the stages of these theatres, and through the financial risks of these shareholders and managers, have come down to us with so much of idealization and so little of these living voices that we have long been wont to think romantically, rather than really, about them. But it is good to walk among living men, to meet them, talk with them, know and feel their lives, careless of what may come of it, but sure in the end that such good is best. If these documents did that only, then they would be well worth reading. But they inform, as well as bring us to a proper mental attitude.

In presenting the new information I have not followed the severe scientific methods of my own models and ideals, because these records are but fragments of large history, and I desire here mainly to put the matter into print for future reference of both myself and others who may engage in the scholar's task and privilege of editing data into truth. I do not feel,

however, that a mere report would be either adequate to the materials or just to the student of literary history. Both scientific accuracy and faithfulness to matter and reader justify and require the printing of these documents *in extenso*, even though they be verbose and prolix. The writers of them, three centuries ago, did not have an eye to our present day ignorance of or unfamiliarity with or injudicial criticism concerning their forms of expression, methods of spelling, punctuation, &c. In being faithful, therefore, to the documents in word and letter, so far as the present printer's facilities allow, I am doing neither more nor less than honest dealing with them demands.

In this sort of work the ideal for the scholar is the original document itself. The next approach to it is the photographic facsimile. Next to that is the type-facsimile, with all signs of contraction presented. It is falling somewhat short of my ideal to have none of these. But since the signs of contraction would require to be specially cast for this matter, I follow the next best method, by expanding into italics all signs of contraction, and making a type-facsimile of all else. When no sign of contraction is found in the original, the shortened form is not here expanded. There is, therefore, in these expansions no "method" or "system" or "uniformity," such as only the unscholastic could wish, but a rigid adherence to the documents themselves, such as every scholar has a right to demand. You will find, for example, such as "pl", "plt", "pl^t", and *plaintiff*, all for the same thing, because only in this last form does the original have a stroke above or through the short form which the present fonts are not provided with. If faithfulness of representation alone did not demand keeping these ununiformities, they should still be retained for the very flavor of antiquity they give. If such forms and the irregular spellings, with capitals and punctuation distributed at random, seem to some no more than merely "quaint," their effect will not have been wholly lost.

Superior letters are kept, long "f" is represented by modern short "s", and signs of contraction, as above, are expanded into italics. Otherwise the print aims to be faithful to the original. Words in square brackets [thus] are not in the documents,

but are inserted by me. Such insertions at the head of the documents merely explain. Those in the body indicate illegibility, from decay, and are supplied either from the context or from some other record of the series.

This matter has gone through the press during my absence from the University. But as the proof-reading has been done under the direction and care of the editor and the committee of the *Studies*, it is hoped that it will be found to be accurate.

II

THE RED BULL THEATRE.

To J. P. Collier, despite his colossal forgeries, we owe great credit for new knowledge and the assembling of old information on the theatre and drama of the period best designated as Shakespearean. His knowledge of the Red Bull was slight, but it was more than had been found out prior to his first publication in 1831. He did not know the date of its erection, but inferred it to be late Elizabeth. He ascertained that it was located at the upper end of St. John street, but erred in supposing it originally an inn yard, like the Bell Savage of Ludgate Hill. He found that it was occupied at some undetermined time in the reign of James I by Queen Anne's men, and then, after her death, March 2, 1618-[19], by some of the same actors under a new name, the Revels company; that it was, as mentioned in Prynne's *Histriomastix*, in 1633 one of the "two old playhouses" and had been "lately reedified and enlarged"; that, under the regime of the Puritans of the Commonwealth, it was, for example in 1647, used clandestinely by once famous actors in play presentations; that it was, after 1660, under the Restoration, used by Thomas Killigrew's royally licensed company; and that before 1663 it was tenanted only by fencers and spiders.

We have, since Collier's day, added to this information. A picture from Kirkman's *Drolls* (1672), certainly much older than its date indicates, shows crudely a portion of the interior and the arrangement of the stage. While this gives us information of a kind, it is of doubtful value in its customary applica-

tion to any theatre of Shakespeare's time. Among the Patent Rolls at the Public Record Office (7 James I, part 39), is a patent of 15 April, 1609, granted by King James to ten actors, servants to the Queen, then acting at the Red Bull and the Curtain. This was first printed by T. E. Tomlins in *The Shakespeare Society's Papers*, 1847. Dr. F. J. Furnivall published in *The New Shakespeare Society Transactions* (1877-1879) certain extracts from the Lord Chamberlain's accounts, preserved in the Public Record Office, showing the amount of red cloth granted for the King's Procession through London at his coronation in 1604, to William Shakespeare and his associates at the Globe, who were known as the King's Men, to the Prince's actors at the Fortune, and to the Queen's men, who then or soon after occupied the Red Bull. We know also some of the plays acted there, and the names of the chief actors throughout the reign of James I.

In 1885 Mr. James Greenstreet, who, for many years during his genealogical researches at the Public Record Office and elsewhere, was employed by Mr. J. O. Halliwell-Phillipps to report to him any documents bearing on Shakespeare or the stage, chanced upon a number of valuable records. Among these was a Chancery suit between members of the Red Bull company, the will of Thomas Green, and three of the minor documents, of easy access, in the Woodford-Holland series presented entire in the following pages. He published his discoveries in *New Shakespeare Society Transactions* and *The Athenaeum*, as also separately, in 1885. All of them are reprinted in F. G. Fleay, *A Chronicle History of the London Stage* (1890).

Thomas Green's will, when isolated, furnishes little information about the Red Bull. But it is of some service when correlated with other matters. The Woodford-Holland order of May 15, 1613, the decree of June 23 following, and the affidavit of July 6, the three which Greenstreet found, fall into proper place in the following new series, so far as the great gaps and losses allow. They are also now printed for the first time accurately. The Chancery suit of May, 1623, yields invaluable information on the management of the company. But as that

suit comes at a later date than the Woodford-Holland and the Smith-Beeston suits here presented, and as I hope later to publish other documents that supplement the Chancery suit, I shall not here deal with its materials.

The following sets of documents increase our information. In spite of their repetitions and verbosity, they furnish us more information about the organization, management, and dissolution of the Red Bull company than all previous documents, except the Chancery suit, and besides throw out valuable new hints as to the methods prevalent in other theatres of the Shakespearean period. I desire here merely to call attention to salient points of interest, reserving for volumes already announced the privilege of adequate correlated presentation and analysis of the history involved.

The Woodford-Holland documents present an anomalous condition. Time has played many pranks with ancient records, and we may well be glad that he has not finished with these as he has with so many. In our long search through some million of records, and indexed names in multiplied number, we have again and again traced a document to its lair, only to find it no longer existed. It is our experience in some classes of documents that nearly all are extant, and in others, of high historical importance, that only about one document in ten or twelve is now preserved. The rest have perished. Sometimes an entire class of documents is gone. The records are well cared for now; but when you see the moulded, rotten, or massed condition of some of them, the result of damp or even neglect in past centuries, you marvel at the perfect preservation and even beauty of others side by side with them, and are thankful for the information they yield in any form, whether whole or fragmentary. The anomaly of the Woodford-Holland records is, that we have left from the ravages of Time and his assistants a complete set of the court's proceedings in a case begun in 1613, but none of the pleadings; and in 1620-21 a complete set of pleadings in practically the same case renewed, but not a single scrap of evidence of the court's proceedings. No witnesses were examined for either Woodford or Holland in the suit of 1620-21, as shown

by the perfect lists of witnesses, term by term, kept in the court's witness-books. A commission was issued to Dyott and Goldsmith to examine witnesses in the 1613 suit, but Goldsmith's report indicates they examined no witnesses, but instead called the plaintiff and defendant together in his office and arrived at a basis of settlement.

The matter in controversy is easy enough to follow. But some of the most valuable points of history are only incidental to the suits, and are elusive. They must be supplied from other sources.

It appears there was some sort of building known as the Red Bull in St. James, Clerkenwell, prior to the theatre that was built on the same place. It was owned by Christopher (?) Beddingfield, whose wife and administratrix, after his death, leased it to Aaron Holland. Holland, at some unknown date before 1605, built the Red Bull theatre there, and leased it out. The date of erection, as shown under the Smith-Beeston documents, must have been between 1603 and 1605.

Following the example set by Shakespeare and his associates in dividing the Globe into shares, as presented in the now famous Osteler-Hemynges documents which I made public in the *London Times*, Oct. 2 and 4, 1909, the Red Bull likewise was divided into shares. It was evidently leased to Queen Anne's company in or before 1605; for Thomas Swynnerton, a lessee of one share or seventh part in that year, with the official position of gatherer—the box-office man of that day—was a member of her company.

About three years later, Swynnerton sold his share or one-seventh part to Philip Stone, who, like Holland, was too ignorant to read or write. A new lease, or indenture, dated in February, 1608, was made accordingly by Holland to Stone, presumably on the same terms as formerly to Swynnerton. In 1612, about the time of Thomas Green's death, when the company underwent several changes, Stone, needing money, sold out to Thomas Woodford, a man little known to historians of the stage, but connected, I find, with nearly every theatre in London. He was a merchant, and traded extensively in continental Europe.

The consideration from Stone to Swynnerton and in turn from Woodford to Stone was 50*l.* outright for the one-seventh part

of the profits, and 50*s.* yearly for one-seventh of the rent of the theatre of the Red Bull. Woodford claims that the profits on one share or seventh part amounted yearly to about 30*l.* Approximately three months after his purchase, Woodford went beyond the seas, and left the business of the Red Bull in the hands of his agent, Anthony Paine, and Holland. During his absence, Paine, he says, failed once to pay the rent on the day it was due, whereupon Holland claimed forfeiture of the share. So, when Woodford a few months later, in 1613, returned, failing to agree with Holland in an equitable settlement, he brought suit against him in the Court of Requests. He asks full restitution of his share, as well as the position of gatherer attached to it, and the profits, which he estimates at about 30*l.* yearly.

The documents themselves best tell the long, hard fight in different suits and courts for a period of nine years to establish what Woodford believed to be his rights. In the main, the Court of Requests sustained Woodford, and the Kings Bench overruled both him and the Court of Requests. Had it not been for the bitter feeling of these two courts toward each other, this case and many another would have been settled shortly. To a student of the English judicature in one of its most visible and rapid periods of evolution, with Sir Edward Coke on one side and Sir Julius Caesar on the other, this case is highly instructive merely from the legal point of view. But the Smith-Beeston case is illuminating in showing how even the parties summoned were affected by the war of the courts in their contempt for the judicial authority of the Court of Requests. I shall later present another in which the contempt becomes comical.

The market value of a share in the Red Bull and its profits furnishes a new basis for estimating the incomes of theatrical shareholders. The Osteler-Hemynges documents, just referred to, estimate the annual profits of one-fourteenth of the Globe at 300*l.*, and one-seventh of the Blackfriars at 300*l.* But I have previously pointed out that this is an excessive estimate and cannot be taken as a proper basis. I am publishing still other documents which show a very conservative and quite accurate estimate of the profits in the Globe. As I deal there with the present

estimate as well as others now available, I need not re-present the matter here. It is sufficient now to note that on the basis furnished by the present documents, the cash value of the Red Bull shares was 350*l.* as a profit-producing concern, its annual rental value was 17*l.* 10*s.*, and its net profits, 210*l.* yearly.

In the 1613 suit, the most important point, for us, concerns "the gatherer's place," the pay for which at the Red Bull was on a percentage of $5\frac{5}{9}\%$ of the total receipts at each play; or, as here put, the eighteenth part of every penny. On this point there is a palpable error in commissioner Goldsmith's report, 22 June, 1613. It is clear that the actual basis of settlement was, not as Goldsmith by hasty error puts it, but, first, that Holland should yield a point and re-grant to Woodford the share or one-seventh part formerly held in succession by Swynnerton, Stone, and him; and second, that Woodford should, in turn, yield up to Holland the gatherer's place and its profits of one penny out of every eighteen collected or received. Goldsmith has simply confused the share in the theatre and the perquisites of the gatherer in his first two articles.

We have long known that the contemporary theatres had "gatherers." But this is the first hint of either the amount or method of pay in any one of them.

The Woodford-Holland documents, with their gaps and interruptions, are here presented in chronological order.

WOODFORD VS. HOLLAND.

Court of Requests Proceedings, Uncalendered, James I.
[1613.]

BILL AND ANSWER.

[Not extant. Date, probably Hilary, 1613, or possibly Easter.]

Decrees and Orders, Easter Term, 11 James I, Vol. 26, p. 730.

10° Maij a° 11° et 46°./

Towching the cause at the sute of Tho: Woodford compl^t againste Aaron Holland def^t, vpon the mocion of M^r Dyot of counsaill wth the said compl^t yt is ordered that the said def^t having convenient

notice of this order shall at his perill attend this court, vpon friday next to shewe cause why a decree should not be made to put the pl^t in present possession of the profittes of that part of the play howse called the redd Bull in question, whereof the pl^t had A lease, and why he should not make vnto the said compl^t A newe lease according to the former lease, made of that part of the saide howse to one Tho: Swynerton, w^{ch} lease by meane assignement came to thandes of the compl^t, & also to shewe cause why he the said def^t should not be accomptable for such moneys as he hath receaued for the pl^t, & why also the arrerages of eighteen pence A weeke due to the gatherers place, & deteyned by the saide def^t should not be referred to some indifferent men texamine & certifie.//

[A transcript of this order, dated 11 May, 11 James I, evidently served by the Messenger of the Chamber on the defendant, is found also in one of the bundles of the uncalendered records of the Court of Requests.]

Decrees and Orders, Easter Term, 11 James I, Vol. 26, p. 780.

xv^{to} die Maij A^o R Regis Jacobi Anglie
ffr: et Hibernie 11^o et Scotie 46^o./

Woodford
Holland In the matter of varyaunce depending before his ma^{tie} & his highenes Counsaill in his ho: Court of Whitehall at the sute of Thomas Woodford gent compl^t against Aaron Holland def^t, Being amongst other thinges for & concerning the compl^{tes} demaund of the eighteenth penny and the eighteenth part of such moneys & other comodities as should bee collected or receaued for certen yeares yet enduring for the profittes of the Galleries or other places in or belonging to the Play howse called the Red Bull at the vpper end of S^t Johns streete London, as in & by the said compl^{tes} bill of complaint is declared, Vnto w^{ch} Bill the said def^t hath made answeare, Wherevpon it is now Ordered by his ma^{tes} said Counsaill by & wth the consent of both the said parties that the said matters of the compl^{tes} bill, & the def^{tes} answeare shalbe wholly & absolutely referred to the hearing and ordering of Anthony Dyot & Clement Gouldsmithes esq^r Counsaillors at lawe being seucrally of counsaill wth the said parties, who are

content to take paines for the composing of the same controuersies, ffor w^{ch} purpose A Commission vnder his highenes Privie Seale shalbe directed vnto the said m^r Dyot & m^r Goldsmith, aucthorising them thereby to call before them both the said parties, together wth all such witnesses as by either partie shalbe nominated And to examine them the said witnesses by their othes in due forme of lawe, vpon such articles Jnterr as by either partie ministred towching the matters of the said bill & answeare, And by all such good wayes & meanes as to them shall seeme meete to searche & fynde out the veritie of the premisses, And therevpon finally to Order & determine the same controuersie if they can, But if they cannot so doe Then to certify their wholl doinges and proceedings therein into this court on the Quindezim of tholy Trinitie next cominge, Wherevpon his mat^{tes} said Counsaill are pleased to take vpon them the vmpirage of the same matters, & finally to determine the same—/

Decrees and Orders, Trinity Term, 11 James I, Vol. 26, p. 835.

xv^{to} die Junij A^o RRegis Jacobi Anglie
ffr: et Hibernie xj^o et Scotie 46^o./

Woodford
Holland

Towching the cause at the sute of Thomas Woodford compl^t against Aaron Holland def^t vpon opening thereof in presence of Counsaill on both sydes it is ordered that the said def^t having convenient notice of this order shall at his perill attend in person in this court vpon monday next (*sedente Curia*) to shewe cause why he should not make A sufficient lease to the compl^t according to the certificat or report of Anthony Dyot esq^r A former Commissioner in this cause, And also why the profettes of the xvijth part of the play howse in question should not be sequestred into thandes of A third person indifferent, to be preserved vntill the said lease be made.//

Commissioners' Report. Found among the uncalendered Proceedings.

Accordinge to a Commission vnder his Mat^{tes} Privie seale to M^r Anthonie Dyett of the Inner Temple Esquior, and my selfe

directed from his Ma^{ties} Courte of Requestes and the Councell thereof to here and determine of the cause in Controuersie dependinge in the said Courte betweene Thomas Woodford p:^{lt} and Aron Holland defend^t. touchinge an interest claymed by the p:^{ltes} bill in the 18.^{tinth} parte of the *profittes* of the plaiehouse called the Redd Bull in the *parishe* of S^t James at Clarkenwell. Wee, in whitsune weeke last, did meete at 2 seuerall tymes at my chamber in Grayes Inne callinge both the *parties* before vs, and heard all Allegacions on both *partes*, and perused the Indentures made by the defend.^t vnto Stone and the *Covenantes* therein, and in the end wee both as I then conceaved did agree and assented vnto these 4 Articles and thinges to be performed by the said *parties* viz://

iffirst that a newe graunte should be forthwth made by the defen.^t vnto the p:^{lt} of the 18.^{tinth} parte of the *profittes* of the said plaie house, for the Remainder of yeares yett to come in the graunte made to the said M.^r Stone, whose interest the said p.^{lt} claymed wth the like *Covenantes* and *Condicons* as were before in Swinerton or Stones graunte/.

2 Secondlie that the defend.^t should enioye the gatherers place then in question betweene theme and not the p:^{lt}/.

3 Thirdlie that M.^r Holland should be discharged as against the p.^{lt} for the meane *profittes* that he hath received since the forfeiture in regard that the gatherers place had heretofore beene detained and kept from him by the p.^{lt} and those from whome he claymeth his interest./

4. Lastlie that in Consideracion of this newe graunte, the p.^{lt} should paie vnto the defend.^t vj.^{li} xiijs^s iiij.^d and be discharged of the halfe yeares rente due at our ladie daye last past w^{ch} came to 25.^s With this Agreement we acquainted both *parties* whoe then seemed vnto vs as we then conceaved to be well pleased wth the same/.

This at the request of the defend.^t I am bould to Certifye vnto this Honourable Courte, the rather for that the said p.^{lt} hath *procured* a single Certificate from the said M.^r Dyett, never makinge me acquainted wth the same leauinge neverthelesse the

cause to the further grave and Iudicious Censure and consideration of this Honorable Courte/

Cle:^t Goldsmyth
22 die Junij 1613.

Decrees and Orders, 11 James I, Vol. 26, p. 890. [Document badly damaged.]

xxiiij^o die Junij A^o &c 11^o et 46^o./

<sup>Woodford
Holland</sup> In the matter of varyaunce depending before his ma^{tie}, and his highenes Counsaill in his ho: Court of Whitehall at the sute of Thomas Woodford gent compl^t against A[aron] Holland def^t, Being amongst other thinges for & concerning the compl^{tes} [d]emaund of the eighteenth penny and eighteenth part of such moneys and other comodities as should be collected or receaved for certen yeares yet enduring for the profittes of the Galleries or other places in or belonging to the Play howse called the red Bull at the vpper end of S^t Johns streete London according to A deede Jndented made & sealed by the said def^t vnto Phillip Stone gent his executo^{rs} administrato^{rs} & assignes and certen covenantes therein for the consideracions & vnder the yearely rent of fiftie shillinges quarterly to be payed by [eve]n porcions in such manner as in the bill is expressed, wth proviso that [in de]fault of payment of the said annuall payment at the dayes for [paym]ent thereof, the benefit & comoditie graunted as aforesaid together [with] the said Jndenture should cease, Which said Phillip Stone hath [graunted] and assigned over by good conveyance in writing his state and [inter]est in the premisses vnto the compl^t and his assignes, And the compl^t [entrusted] the said Holland wth receipt of the profittes thereof to the [use of the compl^t] who promised to deale well wth him in his absence beyond [the seas] And that he would not take advantage of the breache of anie [covenant that mig]ht happen in the time of his absence (if any such shoulde . . . [happen]) Neuertheles the said compl^t did take speciall order with [one An]thony Payne that he should performe the sayd yearely paymentes [of fift]ie shillinges at the dayes wherein the same moneys should growe [due] who neglect-

ing one quarters payment being xij^s vj^d for the space [about] of one day or two the said def^t afterwarde^s refused to accept of the [sam]e and seeketh to take the benefit and advantage of forfeiture of [the] said Jndenture and refuseth to accompt wth the compl^t for the profittes [recei]ued by him wherein the compl^t prayeth releife as in his bill of [comp]laynt is declared. Vnto w^{ch} Bill the said def^t by way of [ans]were amongeste other thinges hath sett furth that if the said compl^t [sh]all satisfie and pay all such sommes of money as he the compl^t or anie other from whom he claymes haue vniustly deteyned or caused to be deteyned from him, he is well contented to make A newe Jndenture vnto the compl^t in his owne name, vnder such covenantes articles provisoes condicions & agreementes as are contained in the said Jndenture formerly made by him to the said Phillip Stone, As by his said answere may appear, Vpon opening of which matter before his ma^{tes} said Counsaill in *presence* of the counsaill learned of both the said parties, and vpon consideracion had of the said def^{tes} said answere & other circumstances of the cause, And for that the said def^t hath not made apparant to this Court what moneys are iustly due vnto him from the said compl^t, It is therefore Ordered by his ma^{tes} said Counsaill that the said compl^t his executo^{rs} & administrato^{rs} shall fromhencefurth haue and receaue the profittes and benefitt of all the said *premisses* in as lardge and ample manner, and in such manner & forme as he or the said Phillip Stone before him or any other person for or on the behalf of the said comp[l^t] or of the said Phillip Stone ever heretofore had and enjoyed the same without the lett denyall disturbauce or contradiccion of the said def^t or any other person or persons clayming in by from or vnder him, vntill such tyme as other and further order shalbe in this court taken and made to the contrary And it is further ordered that the said compl^t s[hall] and may [dr]awe A newe Jndenture or deede Jndented to theeffect of the former wth such covenantes & provisoes as in the former Jndenture graunted to the saide Phillip Stone is conteyned w^{ch} the said def^t shall furthwth vpon request in that behalf to be made seale & deliuer as his deede and

exe[cu]te the same to all intentes and purposes as the said former Jndenture [w]as made and executed notwithstanding any pretended forfeiture there[of] And for the other demaundes aswell of the compl^t as def^t the said par[ties are given] libertie to proceede according to the ordinary course [o]f this Co[urt. And] yt is lastly ordered that an Jniunccion vnder his ma^{tes} Pri[vie Seale] vpon paine of CCC^l shalbe directed to the said def^t and [euery and all other] person or persons clayming in by from or vnder him to whom [in this case] it shall apperteine, for the due performaunce of the present ord[er] //

Process Book, Trinity Term, 11 James I, vol. 183, fol. 377.

Tertio die Julij

An Jniunccion to Aron Holland and others to }
 performe An order at the suite of Tho: Wood- }
 forde gent }

Process Book, Trinity Term, 11 James I, vol. 183, fol. 378, dorso.

Quinto die Julij/

An Attach to the Sheriffes of London middle- }
 sex and ffleete to Attache Aaron Holland at the } xv^o michaelis
 suite of Tho: Woodforde }

Affidavit Book (Draft), 9-13 James I, Miscellaneous Books, 128.

6^o Julij. 1613

J^{nr} Towching the cause at the sute of Tho: Woodford gent compl^t against Aron Holland def^t: Iohn Penkethman of the parishe of S^t Dunstans in the West Scrivener maketh othe, that vpon the fyvth day of this instant moneth & also vpon this present day, he served his ma^{tes} writt of Iniunccion vnder his highenes P. S. vpon the said def^t for performance of an order made in this court betwen the said parties dated the xxiiijth of Iune last & this depon^t yesterday did offer to reade the order & Iniunccion vnto him w^{ch} he refused to hear but the def^{tes} sollicito^r this

present day did reade them both, & tolde the def^t the effect thereof, And this depon^t & also the said compl^t did tender to the saide def^t an Indenture drawne & engrossed according to the said order wth wax ready put therevnto requiring the def^t to seale the same, but he refused so to doe

Joh: Pen^{keth}man

Court of Requests Proceedings, Uncalendered, James I.
[1620.]

WOODFORD'S BILL.

[Upper left and right portions of Bill decayed, and small parts gone. A few words illegible, and the entire Bill difficult to read. Often the ink is gone, and only its impress in the parchment remains, which can still be read with the aid of good light and a magnifying glass.]

[Date of filing, *in dorso*,] xxxj die [Martij] Anno R Regis Iacobi
Anglie ffranc et hiberne xvij^o et Scotie liij^{do}./
Vocetur defend *per nuntium* Camere./

To the Kinges most
Excellent Ma:^{tie}

[Humble] Complayning sheweth vnto yo^r most excellent Ma:^{tie} yo^r humble and faythfull Subiecte and Complain^t Thomas Woodford of Southwarke in the countie of Surry gentleman that wheras one Aron Holland of the parish [of St James] Clerkenwell in the Countie of *Middlesex* yoman was lawfullie possessed of and in one messuage or tenement with thappurtenaunces [Com]onlie called and knowne by the name of the Redd Bull scituate in the parish of S^t [James] Clerkenwell aforesaid by force of a lease therof for manie yeares yet induringe to him therof made by Anne Beddingfeild late wyeffe and administratrix of the goodes and Chattelles of Cristofer(?) Beddingfeild deceased and he the said Aron [soe being]e therof possessed did afterwarde^s erecte builde and sett vpp in and vpon some parte of the same messuage or tenement diuers and sundry buildinges and galler[ies w^{ch} he afterwarde^s] leased for a playhouse [for acting] and [settinge] forthe of playes comedies and traged[ies] or to doe other exercises at and in the same. After w^{ch} he the same Aron Holland soe beinge possessed as aforesaid

of all the same premises wth their ap[urtenances] did by his Indenture of lease [bearinge date the . . . day of . . .] in the third yeare of [the] reigne of yo^r Ma^{tie} over this yo^r highnes Realme of England made betwene the said Aron Holland of the one partie and Thomas Swynnerton of the other partie demise and graunt a seaventh parte of the said playhowse and gallaries with a gatherers place there[to] belonginge or apperteyninge vnto the said Thomas Swynnerton for dyvers yeares then and yet by effluction of tyme to come by force wherof he the said Thomas Swynnerton therunto [entered] and was therof possessed accordingly and he soe beinge therof possessed vpon communicacon and speech therein had betweene them the said Aron Holland and Thomas Swynnerton and one Phillip Stone of London gentleman it was concluded agreed and condiscended betwene them in manner and forme followinge vizt That the said Thomas Swynnerton should surrender and yeild vpp his said lease interest tytle and tearme of yeares in and to the premises vnto the said Aron Holland to the end intent and purpose That he should make such and the like lease for the same for soe manie yeares as weare then therein to come, vnto the said Phillip Stone at the yearelie rent therein before reserved to be payed quarterlie by twelve shillinges and six pence at the foure vsuall tearmes Dayes and tymes in the yeare or within fourteene daies then next ensueinge everie of the said ffeastes and daies in consideracion of fffitie powndes to be payed by the said Phillip Stone vnto the said Thomas Swynnerton of w^{ch} fffitie powndes he the said Thomas Swynnerton should lend twentie powndes to the said Aron Holland for a whole yeare gratis In consideracion wherof the said Aron Holland was to make the said lease to the said Phillip Stone as aforesaid w^{ch} he did then or sone after accordingly But when the said newe lease was to be soe therof made renewed and graunted to the said Phillip Stone as is aforesaid he the said Aron Holland to defraude deceaue and abuse the said Phillip Stone beinge a simple and ignorant man who reposed much trust confidence and credit in the said Aron Holland, and to whome he did referr the renewinge and makinge of the same newe lease in such sorte as the former was w^{ch}

was soe graunted vnto the said Thomas Swynnerton accordinge to the Counterparte therof w^{ch} then remaind wth the said Aron Holland he the said Aron Holland did alter and change the same in dyvers and seauerall materiall pointes therof differinge from the said agreement and from the said former lease soe therof made vnto the said Thomas Swynnerton as is aforesaid to the greatt losse and *preiudice* of the said Phillipp Stone and his assignes w^{ch} he then did not knowe nor was acquainted wth, And namelie in this That wheras the former was a lease and graunte the other later was made without anie lease or graunte at all but onelie bare and single *Covenantes* therein And sealed the same as an *Jndenture* of lease w^{ch} the said Phillipp Stone did verilie beleeve and creditt vpon the wordes affirmacions and solempe protestacon of the said Aron Holland he the said Aron Holland did scale and delyvere his acte and dede the one parte therof vnto the said Phillipp Stone as the same Phillipp Stone alsoe did the other parte therof vnto the said Aron Holland w^{thout} any examinacion or siftinge all of the truth W^{ch} said *Jndenture* beare date aboute ffebruarie Anno domini 1608 and in the sixth yeare of yo^r Ma^{tes} happie raigne over yo^r highnes Realme of England. And afterwardes that is to wytt aboute the tenth yeare of [yo^r] Ma^{tes} raigne of England the said Phillipp Stone then wantinge money and beinge desirous to bargaine wth yo^r said subiecte for the same seaventh parte of the said playhowse and galleries called the Redd Bull w^{ch} had then before that tyme byne graunted to the said Thomas Swynnerton for dyvers yeares from thence to come w^{ch} the said Phillipp Stone pretended and thought [had byn] vnto him well and duly renewed leased and graunted of and in the same by the said Aron Holland he the said Phillipp Stone did offer the same to yo^r said Subiecte for ffiftie poundes makinge him beleeve that he then had a good lease and graunte therof for the same tearme of yeares therein to come whervnto yo^r said subiecte gyveinge fayeth and credit did accepte the same at the hand and motion of the said Phillipp Stone and gaue him for the same the said ffiftie poundes in lawfull money payed according to the said price and offer and thervpon [entered] thervnto and

did quietlie and peceably possesse and enjoye the same seaventh parte accordingle vntill aboute one quarter of a yeare after that yo^r said Subiecte beinge then desirous to trauel beyond the Seas tooke his ioyrney and departed out of this yo^r Ma^{tes} Realme of England wth greate loue frendshipp and kindnes then to him pretended by the said Aron Holland in whom yo^r said Subiecte then and in his absence reposed much trust and confidence in respect of his faire speeches promises and pretences in trustinge the said Aron Holland wth the rentes yssues and profittes of the said seaventh parte duringe his tyme of absence beyond the Seas, w^{ch} he did receaue vntill his retorne for and to the vse of yo^r said Subiecte and to paye over the same vnto one Anthony Payne a *servant* of yo^r said Subiectes to be disposed as he had appointed the same. But yet he yo^r said Subiecte did will and appointe the same Anthonie Payne to see the said rente of twelue shillinges and sixe pence quarterlie as it should growe due to be satisfyed and payed dueliie vnto the said Aron Holland. W^{ch} when the same Holland found and that that tyme was a fytt tyme and opportunitie in yo^r said Subiectes absence beyond the Seas offered for the said Holland to work his will and purpose for the forfeiture of the same into his handes againe then he plotted to effecte his said drifte or purpose and indeavored vndulie to overthrowe the said interest and tyle of yo^r said Subiecte and to that intent did wth faire wordes and kind promises of loue care and respecte vnto yo^r said Subiecte overcome and imboulden the same Anthonie Payne to be remisse and carelesse therein and relye vpon the confidence and trust of the said Aron Holland and vpon his protestacions not onelie of good will regard and favour to yo^r said Subiecte to neglecte a daie or two of the said rent quarterlie to be payed as is aforesaid. But alsoe of not takeinge anie advantage against yo^r said Subiecte but to further and aide him all that the said Aron Holland could therein or in any other matter w^{ch} did lye in his power w^{ch} the said Anthonie Paine beleeuinge to be spoken from his harte and true meaneinge did omitt to observe the daie of payment therof, but wthin a daie or two after tendered and offered the same rente vnto the said Aron Holland w^{ch} he refused contrarie to his

speeches promises and protestacions therein made, and did most conynglie and vnknowne to the said Anthonie Payne demaunde the same rent at the verie daie lymitted and appointed for the payment thereof and for defaulte of payment therof sought and endeavored to take all the advantage and benefytt w^{ch} he could thereby pretendinge and alledginge a forfeiture and reentrie for the non payment therof, And from that tyme w^{ch} was aboute nyne yeares last past hithervnto detayned and kepte the profittes and benefytt of the said seaventh parte to his owne vse and behoffe refusinge to yeild the same or anie parte therof vnto yo^r said Subiecte or to make unto him any manner of reckoninge or accounte for the same amountinge yearelie to thirtie powndes or theraboutes or yet to gyve or allowe anie thinge at all vnto him for or in consideracon of the said ffiftie powndes by him payed for the same. Whervpon yo^r said Subiecte exhibited his bill heartofore in this yo^r Ma^{tes} Courte of Requestes aboute eight yeares last past to be therein releevd against the said Aron Holland who appearinge thervnto the first of Maie in the seaventh yeare of yo^r Ma^{tes} raigne of England, answered his said then bill there, And beinge moved and pricked in his conscience somewhat therein did in his then answere vpon his oath thervnto plainly and trulie confesse, that he thought the said tearme of years ther be efluction of tyme to come and not elapsed he soe made vnto the said Phillipp Stone as is aforesaid did in all equitie belonge and appertaine vnto yo^r said Subiecte the then Complayn^t, and did then therein alsoe proffer and offer voluntarilie vpon his oath that if the said then complayn^t would well and truly satisfie and pay such somes of money as weare iustlie due vnto the said Aron Holland by the said Phillipp Stone or anie from whome he claymed, he the said Aron Holland would be contented to make a newe lease vnto yo^r said Subiecte in his owne name wth the like *Covenantes* articles *Condicons* and *agreements* as weare contayned and specified in the same *Jndenture* formerlie made by him to the said Phillipp Stone whervpon shortlie after that is to saie the three and twenteith day of June in the same eleaventh yeare of yo^r Ma^{tes} said raigne of England vpon openinge of the same matter before yo^r Ma^{tes} Counsell of the said Courte of Re-

questes in presence of the Councell learned of both the said parties, and vpon consideracion had of the said defend^{tes} answere and other circumstances of the cause And for that the said defend^t had not made apparant to the same Courte what monies weare iustlie due vnto him (there beinge in truth none at all) from the said complayn^t yt was therefore ordered by yo^r ma^{tes} said Councell of the same Courte, that the said Complayn^t his executo^{rs} and administrators should from thencforth haue and receaue the profittes and benefyt of all the premises in as lardge and ample manner and in such manner and forme as he the said Phillip Stone before him or any other person for or in the behalf of the said Complayn^t or of the said Phillip Stone ever before that time had and enjoyed the same wthout the lett deniall disturbance or contradiction of him the said def^t or anie other person or persons claymeinge in by from or vnder him vntill such time as other and further order should be in that Courte taken and made (w^{ch} hath not hithervnto byne) to the contrarie. And it was then alsoe further ordered That the said Comp:^l should and might drawe a newe Jndenture or deede Jndented to theeffecte of the former wth such Covenantes and provisoes as in the said former Jndenture graunted to the said Phillip Stone was containd w^{ch} the said def^t should forthwth vpon request in that behalf to be made seale and delyver as his deede and execute the same to all intentes and purposes as the said former Jndenture was made and executed notwthstandinge anie pretended forfeiture therof. And for the other demaundes aswell of the said Complayn^t as def^t the said parties weare lefte at libertie to proceede accordinge to the ordinarie course of that Courte. And it was lastlie then therby ordered That an Jniunction vnder his Ma:^{tes} privie Seale vpon paine of 300^{li} should be directed to the said defend^t and all and every other person and persons claymeinge by from or vnder him to whome in that case it should appertaine for the due performance of the same order as thereby may appeare Whervpon presently after, did according to the same order cause a new paire of Jndentures to be drawn and ingrossed betwene the said Aron Holland and yo^r said Subjecte like and agreable to the former w^{ch} weare soe had and made

betwene the same Holland and Phillipp Stone as is aforesaid, and did offer and tender the same vnto the said Holland to be sealed and delyvered accordinge to the same order, w^{ch} was then alsoe shewed vnto him wth a writt or Jnunction under yo^r Ma:^{tes} privie Seale de execucione ordinis therein for the performance therof W^{ch} he the said Aron Holland then seemed willinge to doe accordinglie But for asmuch as at that tyme he pretended he was vtterlie vnlearned and illiterate not beinge able to reade; and then knewe not whether the same weare agreable to the former Jndenture, and to the said order he therefore requested yo^r said Subiecte to forbear a little tyme and to gyve him soe much libertie onelie as his then Councill Ra^lph Wormeleighton Esquier might *per*vse the same and see whether those newe Jndentures did agree wth the former Jndentures of the said Phillipp Stone and wth the said before recited order because he could not reade them nor compare them togeather promisinge then alsoe that assoone as his said Councill might *per*vse the same he would seale and delyver the one parte therof as his acte and deede vnto yo^r said Subiecte if the weare soe agreable or fittinge for him to seale and delyver, The other parte whervnto yo^r said Subiecte yeilded and delyvered him the same ingrossed booke for that purpose to be seene and *per*vsed by his said Councill who vpon examinacion therof (as it is saied) fynding it to agree both wth the said order and former Jndenture made to the said Phillipp Stone did narrowlie search consulte and consider with the said Aron Holland howe to find a meanes or way to evade and overreach or prevent the said order, and therby to avoyd the sealinge and delyveringe of the said Jndenture by the said Aron Holland Wherein it is credeably reported and verie like that they thus proceeded and resolved as followeth, That is to saie That he the said Aron Holland should gyve vnto his said Councill a good Some of money to crosse the proceedinges of this honorable Courte and to effecte and worke the same And that his said Councill should be bound by his obligacion or bound vnto the said Aron Holland to *per*forme the same and to leaue yo^r Subiecte without remedie either in lawe or equitie w^{ch} was alsoe accomplished. Whervpon they pretended and by agreement be-

twene them gaue forth in their seaverall speeches vnto yo^r said Subiecte that his said Councell was soe much busied and imployed otherwise that he could intend to *per*vse and dispatch the same speedilie but must take longer tyme therein w^{ch} should then shortlie after be done to the good likeinge and contentment of yo^r said Subiecte. And then shortlie after they concluded and agreed that his said Councell should move in his Ma^{tes} Bench for a prohibicion in the said Cause, and obtaine and serve the same against yo^r said Subiecte w^{ch} was done accordingly to w^{ch} end and purpose the protractinge and lingeringe aforesaid vntill the said prohibicion was graunted was onely invented and soe devised In respecte that the said Jndenture made by the said Aron Holland to the said Phillipp Stone was not anie lease at all but onelie an Jndenture of *Covenantes* w^{ch} yo^r said Subiecte before that time did not vnderstand but nowe *per*ceavinge that the Counsell of yo^r Ma^{tes} said Courte of Requestes and he himself had byne soe much deluded and abused therein by his Counsells indirecte procedinges did resorte vnto his owne Counsell learned in the lawe to be therein advised what he should doe whoe did then *per*swade him to exhibit a newe bill in yo^r Ma^{tes} said Courte of Requestes for the same matter in the name of the said Phillipp Stone against the said Aron Holland haveinge authoritie vnder the hand and Seale of the said Phillipp Stone soe to doe, w^{ch} he soe alsoe did, and thervpon procured the said Aron Holland to be warned by the then officer or messenger attendinge yo^r Ma^{tes} said Councell in yo^r honorable Courte of Whitehall to appeare then and their to answeare the same newe bill in the said Phillipp Stones name but by the helpe and intervencion of his the said Aron Hollandes Counsayle to prevent the daunger of his said bond the said Phillipp Stone was sought out by one Marie Phillipps for tenn shillinges to be brought vnto him the said Holland to be dealte withall and *per*swaded to drawe the said Phillipp Stone to release (as he thervpon in the end did) the same suite and all *Covenantes* accions and demaundes vnto the said Aron Holland to the intent to defraude and defeate yo^r said Subiecte therein and to avoyde and discharge the same newe bill and defraude the said order

and the true intent and meaneing therof w^{ch} new bill he the same Aron Holland could not otherwise answeere or avoyde then by pleadinge therevnto (as he did the same release soe made and gotten from the said Phillipp Stone vndulie and vnconscionably and by [fraude] coveyne and deciepte as aforesaid) to the *preiudice* and hurte of yo^r said Subiecte and to the manifest abuse and apparant contempte of this honorable Courte. Sithence w^{ch} tyme soe it is alsoe if it may please yo^r Ma^{tie} That the said two *seauerall deedes* or *Jndentures* made by the said Aron Holland to the said Phillipp Stone, and thother by the said Phillipp Stone vnto yo^r said Subiecte and both of them of right belonginge and *appertayning* to him yo^r said Subiecte are nowe by casuall meanes come vnto the *handes* and possession of the said Aron Holland and Phillip Stone whoe by coullor of haueinge therof haue not onely vniustly and wrongfully without anie lawfull right entered into the same *premises* therby demised or intended to be so graunted But alsoe haue betweene themselues and certaine other *persons* to yo^r said Subiecte as yet vnknowne made and contryved certaine *secrett* and *subtill estates* and *Convayances* of and in the *premises* to the intent yo^r said Subiecte should not knowe whome to sue for the same and for the *rentes* yssues and *profittes* of the *premises* by them receiued and detayned vniustlie and vnconscionably from yo^r said Subiecte for w^{ch} therefore and that he doeth not knowe either the certaine and sure *contentes* or *dates* of the same *seauerall deedes* indented and release or wherein the same are or either of them is contayned whither in *bagge* or *boxe* sealed Chest truncke or *Cubbord* locked or otherwise, yo^r said Subiecte is w^{thout} all remedie by the strickt course of the Comon lawes of this Realme or elswhears then in equitie In tender consideracion wherof And to thend and purpose that the full and whole truth therein concerninge the said matters and *premises* may appeare by the *Answears* of the said Aron Holland and Phillip Stone vpon their oathes w^{ch} yo^r said Subiecte hopeth that they will confesse and desireth may be done accordingly And for that alsoe yo^r said Subiecte maybe righted and releued therein and the said Courte satisfied at leangth for the same And that the said order of this Courte should not be

deluded and defrauded but iustly satisfied and performed accordinge to theeffecte and true meaneinge therof And alsoe that the said Aron Holland may be compelled to make good and performe his owne offer vpon his oathes aforesaid voluntarily made by his said Answere and accepted by yo^r said Subiecte and the said Courte accordinge to the said recited order As by all lawes he should and ought to doe And that the meane *profittes* by them vniustly detayned may be restored allsoe to yo^r said Subiecte May it therefore please yo^r Ma:^{tie} to graunte vnto yo^r subiecte yo^r Ma:^{tes} most gracious writt of Prive Seale to be directed to the said Aron Holland and Phillip Stone thereby comaundinge them and either of them at a certaine day and vnder a certaine paine therein to be lymitted to be and appeare before yo^r Ma:^{tie} and Councill of Whitehall then and there to answere the premises And further to stand to and abide such further order and direction therein And [sic=as] to yo^r Ma:^{tie} and yo^r said Councill shalbe thought fittinge And yo^r said Subiecte accordinge to his bounden dutie shall pray &c. Ra/phe Wilbraham

HOLLAND'S ANSWER

[Damaged. Small part of upper left hand corner gone. Date line placed there partly gone, partly illegible. Whole document difficult to read; ink sometimes rubbed or mouldered off].

The Answere of Aron Holland gent def^t to the vntrue and scandalous Bill of Thomas woodford *alias* Simball yeoman Comp.^{1t}/

The [said defendant] by *protestacon* not Confessinge anie the thinges or matters in and by the said Bill of Complainte Contained to be true in such sorte manner and forme [as in] and by the same they are and bin Contained, but verily thinketh this suite is meerey begunne to putt this def.^t to vnecessary Costes and Charges in the lawe rather [then] vpon anie iuste or true grounde soe to doe, And the rather this def.^t is induced soe to thinke for that the pl.^t was in the very same suite formerly by him exhibited [in] this Courte againste this def.^t after manie mocions & vpon longe debatinge of the Cause in his Ma:^{tes} high Courte

of Kinges Bench in the presence of Councell learned [on] bothe sides prohibited by his Ma^{tes} most gracious writt of prohibition beareinge date [the] Sexto die Novembris 11 [Anno] R Rs Jacobi w^{ch} accordingly was served vppon him his Councell and Att[orney] in the said Corte of Requestes wherevppon hee surcessed his said vexacious suite but after Commenced the like suite in the name of the said Phillipp Stone in the Bill mencioned wthout his priuity as the said Stone said and testified vnder his hand when takinge notice thereof very honestly vnder his hand and seale disavowed & disclaimed the said suite as in & by the same ready to be shewed to this Ho.^{bie} Courte may appeare, wherevppon this def.^t was againe dismissed and not herewth Contented the said Woodford for farther vexacion Comenced suite againste this def.^t in the name of the said Phillip Stone in his Ma:^{tes} high Courte of Kinges Bench & wthout his privity as this def.^t verily thinketh it beinge followed & sollicited by the said woodford and att his Costes & Charges as this def.^t hath Crediblye heard, w^{ch} suite Cominge to tryall before the right Ho.^{bie} the now Lord Cheefe Justice of England in the Guildhall london after full evidence the matter beinge proved Cleere for this def.^t the said Phillip Stone became nonsuit, Att w^{ch} tryall the badd dealinge of the said woodford was apparantlie proved before his good Lordshipp And this def.^t denieth hee ever did abuse the said M.^r Phillip Stone, or that the said Indenture of graunte was otherwise made to him then accordinge to his owne agreem.^t & by his owne Consent direcon and advise & by his owne Councell for this def.^t saith hee is vnlettered & therefore referred the same in all thinges to the truste & Care of the said Phillip Stone, And this def.^t directly denieth that M.^r wormlaighton his Councell did ever give him anie manner of advise to frustrate the orders of this Courte, for he saith M.^r Clement Gouldsmith was then of Councell wth him and in whome this def.^t relyed and what was done therein and all thinges touching that suite or procureinge the said prohibicon was done by the advise of the said M.^r Gouldsmith and not by the said M.^r Wormlaighton, And therefore this def.^t saith vppon his othe that the said M.^r wormlaighton did never become bound by anie bond or obligacion vnto this def.^t to

doe or performe anie thinge as in & by the Bill is moste slanderously and wthout anie pretext or shadowe of truthe alleaged or was ever bound to this def.^t for anie Cause or thinge whatsoever and as this def.^t verily beleeveth in his Conscience the Comp.^{lt} meerey suggesteth & deviseth the same of his owne head wthout anye Color of truthe soe to doe, And this def.^t further saithe that longe after all the surmises in the said Bill mencioned & to purchase his peace in his old age especially againste soe Contentious and bad a person as the Comp.^{lt} is knowne to be both to reverend Judges & other Justices & Jurors. This def.^t repaired to the said Phillip Stone and acquainted him wth the Comp.^{lt}es Courses. And therevpon for such Consideracions as was agreed betwixt them he the said Phillip Stone did by his release vnder his hand & seale beareinge date xvjth daye of Maye in the twelwe yeare of his Ma^{tes} Raigne that nowe is very voluntarily and freely remise and release vnto this def.^t all manner of Accones suites, Covenantes, and demaundes as in & by the same vnto w^{ch} Relacion had for the more Certainty doth and may appeare And therefore this def.^t doth demurr and abide in lawe and humblie demaund Judm.^t of this Ho:^{ble} Courte whether this def.^t shalbe Compelled to make anie other or further Answer to the said scandalous Bill of Comp.^{lt} or matters thereby sett forth And this def.^t denieth that hee hath or ever had anie the deedes Jndented in the Bill mencioned or anie other deedes whatsoever that belonge or ever did belonge to the said Phillip Stone or the said Comp.^{lt} wthout that, that anie other matter thinge or thinges materiall or effectuall in the said Bill of Complaint Conteyned & not by him sufficiently Confessed & avoyded, Traversed or denyed is true, All w^{ch} matters this def.^t is & wilbe ready to Avertt iustifie maintaine & prove as this most Ho:^{ble} Courte shall award And humblie prayeth to be hence dismissed wth his reasonable Costes & Charges in this behalfe most wrongfully susteyned./

R: Wormloughton.

Appearance Book, 16-17 James I [Not numbered and not paged. Found among the uncalendered Proceedings and miscellaneous papers. Labeled, "Liber Emptae".]

[31 May, 17 James I.]

Aron Holland *personaliter* comparet coram Consilio per mandatum nunciij Camerae ad sectam Thomae Woodford &c postea viz Septimo die Ju mensis instantis Admissus est per Cō: consilio Wormlaighton

III

THE RED BULL COMPANY.

The Woodford-Holland suit grows out of relations of shareholders in regard to ownership and profits. The Smith-Beeston suit grows out of equally unhappy relations of the company in its expenditures for playing apparel, furniture, and other necessities.

The history of the Red Bull company is only in part known. Early in the reign of James I, very possibly in 1603 as has been surmised, the Earl of Worcester's players became Queen Anne's servants. Collier published an undated draft for a patent to them as acting at the Curtain and Boar's Head, which must date 1603. I have not seen the original. The earliest declared date of their new patronage is March 15, 1604, when they were granted red cloth for the King's coronation, as already mentioned. The patent of 15 April, 7 James I (1609), also previously mentioned, furnishes the earliest date hitherto known of their acting at the Red Bull. The Woodford-Holland documents show that the Red Bull was built in or before 1605, and that Thomas Swynnerton, one of the Queen's company, in that year owned a share in it. When all these evidences are examined, it becomes as certain as circumstances unsupported by contemporary declaration can make it, that Queen Anne's company occupied the Red Bull continuously from the time of its erection, which must have been, on the same evidences, sometime between 1603 and 1605, till their dissolution, 1619.

There were originally ten actors in the company. In the 1604 grant of red cloth, as also in the undated draft for patent, and finally in the 1609 patent, they were, as there put down, Thomas Greene, Christopher Beeston, Thomas Heywood, Richard Perkins,

Richard [Robert] Pallant, Thomas Swynnerton, John Duke, Robert Lee, Jacob [James] Hoult, Robert Beeston. During the course of years the membership changed, so that at the time of the Smith-Beeston suit and the Chancery suit before referred to, there are a number of new names.

In 1612 Thomas Green died. He was one of the chief actors of Shakespeare's time, and was to Queen Anne's company what Burbage was to the Globe company, or Nat Field to the Children of the Revels at Blackfriars, or Joseph Taylor to the various companies he associated himself with. With Green's death began those conditions of the Red Bull actors that in the next seven years prepared for the final dissolution that came with the death of the Queen. A portion of their troubles are related in the Chancery suit. Others are here told in the Smith-Beeston controversy.

When Green died, the choice of the company fell upon his friend, Christopher Beeston, to take his place as general director and business manager. Beeston was well-to-do, while his associate actors were not men of any means. Every man in the company, these documents say, had to have some office, and his was one that required a man of business capacity and financial standing to secure the company's credit and existence. How unsatisfactorily he filled his post these records let us know. Possibly from an earlier date, but certainly from 1612 to 1619, he purchased all apparel, furniture, and other things necessary for setting forth plays. For this purpose the company allowed him one-half the receipts from the galleries,—an amount which, unfortunately, is not more definitely stated.

In 1612, Beeston arranged with John Smith to furnish the company all tinsel stuffs and other loom stuffs that might be required. Between 27 June of that year and 20 February, 1616, when the company began to break up with dissensions, Smith delivered goods to the value of 46*l.* 5*s.* 8*d.*, which, he claims, were never paid for. This is the immediate cause of the present suit. The larger cause is in the relations of the company, and

Beeston's unsatisfactory manner of handling the money and rendering account.

Beeston apparently in 1616 was unable to give a satisfactory explanation of his expenditures, particularly of 400 *l.*, of the company's money. Some of the members in that year left and joined others. The Queen's men from that time to her death seem to have had their full share of variance and strife. When the death of Queen Anne finally dissolved them, some went to other theatres, some quit the profession, while the rest still held together and formed a new organization at the Red Bull under the name of the company of the Revels,—a name made popular by long association with successful performances of young men at the Blackfriars and Whitefriars. At the breaking up, Beeston went as manager to Prince Charles's company. He took with him, it is claimed, also all the apparel and furniture of the Red Bull stage, in spite of the fact that it had been bought with the company's money.

Under the above conditions, Smith could not, he claims, get the money due him, and so brought this suit a few months after the Queen's death and the company's disbanding.

Why Emanuel Read never appears in plays after about 1616 is explained, not by his death, as others have supposed, but by the fact that he took up permanent residence in Ireland about 1616 or 1617, as Mrs. Richard Perkins testifies.

The case dragged on for a year, chiefly through delays interposed by Beeston. Smith's affidavit of 4 November, 1620, shows the popular contempt, as exhibited in Beeston's attitude, for the Court of Requests. This was but a natural result of the stubborn conflict of authority between that court and the King's Bench, culminating twenty-five years later in victory for the King's Bench and the abolition of the Court of Requests.

The series of documents in the Smith-Beeston controversy is almost intact. Only the final decree of the court seems lacking. They are here presented in chronological order.

SMITH VS BEESTON

Court of Requests Proceedings, Uncalendered, James I.
[1619.]

SMITH'S BILL

[Date of filing, *in dorso*] x^o die Novembris Anno Rni Rg
Jacobi Angl fr et hibernie xvij^o et Scotie lxij^o
Defend vocet^r *per nuncium* Camer.

To the Kings most Ex-
cellent Ma^{tie}./

Humbly complayning sheweth vnto your most excellent Ma^{tie} your faithfull and obedient subiect John Smith Citizen and ffishmonger of London That Whereas your said Subiect did heretofore betweene the Seaven and twentieth daie of June in the yeare of our Lord God One thousand six hundred and twelve and the three and twentieth daie off ffebruary Anno Domini One thousand Six hundred and Sixteene at the earnest request and intreaty of one Christofer Beeston deliuer or cause to be deliuered vnto him the said Christofer Beeston and his Assignes and at his request and by his direccion vnto and for the vse of the Company of players at the Redd Bull neere S^t Jones viz.^t vnto Ellis Worth Richard Perkins and John Comber and others diverse tinsell stuffes and other stufte for their vse in playing amounting in the wholl to ffourtie six poundes five shillings and eight pence or thereaboutes And the said Christofer Beeston did faithfully promis to make payment vnto your said subiect and to satisfie him for the said stufte. Now soe it is may it please your most excellent Ma^{tie} that your said subiect having deliuered the said stuffes by the appointment of the said Beeston as aforesaid vnto him or his assignes And althoughe the said Beeston doth well know that the said stuffes were deliuered vnto him & vnto his vse and by his appointment And that the seuerall parcelles deliuered as aforesaid did amount vnto the said some of ffourtie six poundes five shillings & eight pence or thereaboutes according to the seuerall rates and prices agreed vpon by the said Beeston or his Assignes And that the said Beeston Ellis Worth

Richard Perkins and John Cumber or some of them have since the deliuerie thereof *pervsed* the same by your said Subiectes booke and well know that the said some of ffourtie six poundes five shillings & eight pence is due vnto your said Subiect for the same And that your said Subiect since the deliuerie thereof hath in most kinde and frendly maner required payment of the said Beeston And that the said Beeston hath faithfully from time to time promised vnto your said Subiect payment & satisfaccion for the same Yet now of late the said Christofer Beeston Ellis Worth Richard Perkins and John Cumber combyning themselves together how to deceave your said Subiect of his just and true debt, and have intised over Thomas Chambers your said Subiectes *servant* from your said Subiectes *service* and caused him to absent himselfe vnto some *parte* beyond the Seas or into some vnknowne & remote place From your said Subiect where your said Subiect cannot heare of him knowing that your subiectes said *servant* was the onlie witnes w^{ch} your said Subiect had to prove the deliuerie of the said *Stuffes* as aforesaid and of the contract aforesaid And now the said Beeston and the said Worth Perkins and Comber doe give forth & report that they or some of them by the appointment of the said Beeston have paid and discharged the said debt of ffourtie six poundes five shillings & eight pence vnto your Subiect or vnto his said *servant* whereas in truth they nor either of them have satisfied any peny thereof but deteyne the said some of ffourty six poundes five shillings and eight pence in his their or some of their *handes* and intend vtterly to defeate your said Subiect of the same And your said Subiect further sheweth that the said Beeston, Worth, Perkins, and Cumber have heretofore and since your said Subiectes deliuerie of the said *stuffes* as aforesaid falling at variance and strife amongst themselves and separated and devided themselves into other Companies. And vpon their *separacion* did acknowledge your said Subiectes debt but questioned betweene themselves w^{ch} of them should paie and discharge your said Subiect So that by their variance and for want of sufficient witnesses to prove the deliuerie of the said *stuffes* and promis for the same your said Subiect is likelie to loose the said debt except he be releived by

your Ma^{tie} in equitie for the same In tender consideracion whereof & for that your said Subiect hath noe witnesses to prove the deliuerie of the said stuffes nor the promis of the said Beeston and since of the said Worth Perkins and Cumber vnto your said Subiect for the payment thereof but hopeth that the said Christofer Beeston Ellis Worth Richard Perkins and John Cumber will vpon their Corporall oathes confesse and acknowledge what stuffes or other wares they or anie of them or any other to their or any of their vse or vses have had and received from your said subiect or his said *servant* or anie other your said subiectes *servantes* and by whose appointment and direccion and vpon whose Accompt And whether the said Beeston Worth Perkins and Cumber or some of them did not vndertake to paie for the same or w^{ch} of them or who vndertooke the same And also what money they or anie of them have made payment of the said ffourty six poundes ffive shillings and eight pence or anie part thereof, and how much they or anie of them have paid thereof and by whose handes & appointment And whether the said Beeston did not from time to time give direccions for all such somes as were paid, and how much is remaying vnpaid vnto your said Subiect of the said debt of ffourtie six poundes five shillings and eight pence and w^{ch} of them ought to pay the same May it therefore please your most excellent Ma^{ty} the *premisses* considered to grant vnto your said Subiect your Ma^{ties} most graceous writt of privie Seale to be directed to the said Christofer Beeston Ellis worth Richard Perkins and John Cumber Comanding them and every of them thereby at a certen daie and vnder a certen paine therein to be lymitted *personally* to be and appeare before your most excellent Ma^{tie} in your Ma^{ties} Court at whitehall Comonly called the Court of Requestes then & there to answer the *premisses* and every *parte* thereof, and further to stand to and abide such further Order & direccion therein as to your most excellent Maiesty shall seeme to stand wth equitie and good conscience And your said Subiect according to his bounden dutie shall dailie pray for your Ma^{ties} long health and happie reigne over vs

W^m Tayler./.

WORTH, CUMBER, AND PERKINS'S ANSWER

xviii^o die Novembris
 Anno R Regis Jacobi Angl
 franc et hibnie xvij^o et Scotie liij^o./

The ioynt and seuerall answers of Ellis Worth,
 Richard Perkins, and John Cumber defend^{tes} to
 the Bill of Comp.^{lt} of John Smith Compl.^t

The advantage of exception to the incertentie insufficiency wants faults and ymperfeccions of the Bill of Comp.^{lt} vnto these Defend.^{tes} and every of them nowe and att all tymes hereafter saved for full answer and perfect Declaracion of the truth for such matters wherewith they and every of them stand chardged in and by the said Bill they and every of them saye in manner & forme followinge And first theis Defend.^{tes} saie That the said Christopher Beeston in the Bill of Compl.^t named and theis Defend.^{tes} haue for Divers yeeres past bene the Actors & servants of the late Queene Anne of famous memorie & haue Dureinge theis yeeres bene a companie & sett forth Divers plaies & comedies att the Redd bull neare S^t Jones in London for the better orderinge and setting forth of w^{ch} said plaies & comedies there required Divers officers and that every one of the said Actors should take vpon them some place & charge & for that the prouision of the furniture & apparrell was a place of greatest chardge & trust and must of necessitie fall vpon a thriueing man & one that was of abilitie & meanes itt was agreed by and betweene the said Companie of Actors in manner and forme following That is to saye that the said Christopher Beeston in the bill of Comp.^{lt} named should Defaulke outt of the colleccions and gatheringes w^{ch} were made continually whensoever any playe was acted a certen some of money as a comon stock towards the buyeing & Defraying of the charges of the furniture & apparrell aforesaid And that the said Christopher Beeston should buy all the furniture apparrell & other necessaries w^{ch} should be requisite for there condicion & qualitie And that the said Christopher Beeston should wth the said comon stock soe collected paye for the said comodities by him hereafter to be bought or other wise that the said comodities should stand vpon the sole

& *proper* accompt & head of the said Beeston & that noe other of the companie should be troubled or ymployed in this busines or should paye or stand charged or lyable for any comodities soe by the said Christopher Beeston to be bought butt that the said Christopher Beeston should discharge & free the Company & paye all such moneyes as should arise by reason thereof & if there did fall outt any surplusage or remainder of the *Common* stocke & money soe by him to be gathered, that then the said Beeston should give a true accompt vnto the company & that every one of them should haue a share & part according to there place & qualitie & ypon this agreem^t the said Christopher Beeston did vndertake this chardge & trust & hath for the space of seaven or eight yeeres continually when there was any playe, Deducted & Defaulted diuers greate somes of money outt of the colleccions & gatheringes aforesaid & hath wth the said moneyes much enriched himself as these Defd.^{tes} conceaue, and besides did att one tyme yeald vnto these defend^{tes} as they verily thinke a false accompte of fower hundred poundes w^{ch} the said Beeston confessed he had collected togeather, & Did by the said accompte pretend that he had Disbursed the same for the good and benefitt of the Company & hath wth the said moneyes bought all the furniture & apperell vntill that tyme vsed the w^{ch} these Defend.^{tes} could nott tell howe to disprooue for the said Beeston according to the former agreem.^t did what hee listed, & of himself wthoutt the privitye Direccion or knowledge of any of these Defend^{tes} bought of Divers men Divers comodities & hath as the sd Defend^{tes} verely beleue payd for the same in regard there was neuer any tradsman since the agreem^t aforesaid butt this comp.^{l^t} that ever Demanded any money of these Defend^{tes} or any of them for comodities soe bought by the saide Christopher Beeston neither Doe these Defend^{tes} or any of them knowe of whom the said Christopher Beeston Did vse to buy the apparell & comodities aforesaid, or what contracts covenant^s & agreem^{tes} he made wth them, or certainly knowe whether the said Christopher Beeston payd readie money for the said comodities or tooke them vpon his creditt & accompt neither Doe these Defend^{tes} knowe that the said Christopher Beeston Did ever buy any comodities

of the said Comp.^{lt} or that the Comp.^{lt} did att any tyme att the earnest request & intreatie of the said Christopher Deliuier or cause to be Deliuered vnto the said Christopher Beeston or his assignes & att his request & by his Direccion vnto & for the vse of these Defend^{tes} Divers tinsell stuffes & other stuffes for there vses amountheing to the some of fortie six poundes fyve shillinges & eight pence or their abouts neither Doe these Defend^{tes} or any of them knowe if the said Christopher Beeston Did take vpp the said stuffes whether the said Christopher Beeston did paye readye money for them or whether he did faithfullie make promise to make payem^t to the Comp.^{lt} or to satisfie him for the said stuffes or whether he hath from tyme to tyme promised the Comp.^{lt} payem^t & satisfaccion for the same. Butt if the said Beeston did buy any such stuffes of the Comp.^{lt} & made the agreem.^{tes} promises & contracts aforesaid then these Defend^{tes} Doe verylie beleue that the said Beeston & the Comp.^{lt} are combined together & doe practise to trouble & molest these Defend.^{tes} hoping thereby either to come by some composition or otherwise some couller for the said Beeston to exclayne on these Defend.^{tes} & the rest of the companie. Wthout that these Defend.^{tes} since the Deliuery of the said stuffes perused the said Comp^{ltes} bookes & Doe knowe y^t the said some of fortie six poundes fyve shillinges & eight pence or any parte or parcell thereof is Due to the Comp^{lt} for the same & wthoutt that the said Christopher Beeston & these Defend.^{tes} Did combine themselues together how to Deceau the Comp^{lt} of his iust & due Debt, or that these Defend.^{tes} did ever knowe the said Thomas Chambers the Comp^{ltes} seruant or ever inticed the said Thomas Chambers from the Comp^{ltes} seruice or ever caused him to absent him self into some partes beyond the seas or vnto some vnknownen & remote place where the Comp^{lt} cannott heare of him or that these Defend^{tes} Did knowe that the said Thomas Chambers was the onely witnes the Comp^{lt} had to prooue the Deliuery of the said stuffes & contract aforesaid And wthoutt that theis Defend^{tes} or any of them haue given outt and reported that they or any of them by the appointm^t of the said Beeston hath paid & Dis-

charged the said Debt of fortie six poundes five shillings & eight pence vnto the said Comp.^{lt} or vnto his said servant & wthoutt that the sd Defend.^{tes} or any of them vpon the separacion made by Beeston & these Defend.^{tes} Did acknowledge the Comp.^{ltes} Debt or questioned betweene themselues w^{ch} of these Defend.^{tes} should paie the Comp.^{ltes} Debt. Butt true itt is that the said Beeston haueing from the begining a greater care for his owne privatt gaine & nott respecting the good of these Defend.^{tes} & the rest of his fellowes & companions hath in the place & trust aforesaid much enriched himself, & hath of late given over his coate & condicion & separated & Devided himself from these Defend.^{tes} carrying awaie nott onely all the furniture & apparell parte whereof is pretended by the said Comp.^{lt} to be made wth his stuff & still to be payd for butt alsoe suffering the comp.^{lt} to sue molest & trouble these Defend.^{tes} notwthstanding these Defend.^{tes} doe knowe y^t the said Beeston would nott haue engaged himself for any stuff vnlesse the said Beeston had formerlie receaued outt of the colleccions aforesaid as much money as would haue answered for the same And notwthstanding these Defend.^{tes} hopeth that the said Beeston will vpon his corporall oath confesse that he hath receaued satisfaccion for the said stuffes if any such were bought contrarie to all equetie and good conscience by reason of whoes vnconsionable and extreame Dealeinges there was greate variance & striffe betweene the said Defend.^{tes} & the said Beeston vpon there separacion as in the said bill of complt is surmised And wthoutt that these Defend.^{tes} or any of them Did ever promise the Comp.^{lt} to paye for the said stuffes pretended by his bill of Comp.^{lt} to be Deliuered vnto the said Beeston or his assignes or Did ever vndertake the payem^t thereof or that these Defend.^{tes} or any of them or any other by there appointm.^t & Direccion haue had & receaued of the Comp.^{lt} or of his said servant or of any other of the Comp.^{ltes} servants any stuffes or wares whatsoever And wthoutt that any other matter cause or thinge in the said bill of Comp.^{lt} materiall for these Defend.^{tes} to answer vnto & therein nott sufficiently answered vnto are true. All w^{ch} matters these Defend.^{tes} are & will be readie to averr &

prooue as this ho.^{ble} court shall award & humblie prayeth to be
Dismissed wth there reasonable costes & charges in this behalf
wrongfully susteyned./ Robert Wolrych

Appearance Book, 16-17 James I. [Not numbered nor paged.
Found among the uncalendered Proceedings and miscellaneous
papers. Labeled "Liber Emptae."]

[18 November, 17 James I.]

Xpofe Beston *personaliter comparet coram consilio regis per
mandatum nunciij Ad sectam Johannis Smithe postea viz xxiiij^o
die mensis instantis Admissus est per Langley consilio magistri
Gosnolde*

BEESTON'S ANSWER

xxiiij^o die Novembris Anno Regni Regis Jacobi Angliæ ffranc et Hiberniæ
xvij^o et Scotiæ quinquagesimo tertio./ 1619./

Langley *pro defendt*

The answere of Christopher Beston one
of the defendantes to the bill of Comp.^t
of Iohn Smyth Comp.^t

The said Defendant (for somuch as concernes himself) saith, that
the said bill of Complaint, is soe vncertain, and otherwise insuffi-
cient in lawe, as it is vnpossible to make any Direct answere there-
vnto, for many respectes; and namely in that the Complaynant
chargeth the said Defend^t; or his assignes in the Disiunctive, and
vncertainly, (not nameinge or putting any of them in certain) to
haue had and received certen tinsell stuffes and other stuffes of
the Complayn^t, not settinge Downe what other stuffes, nor how
much of every kind nor the severall prices thereof, which him-
self (having best notice of (if any such had ben) ought to haue
ben Declared in Certeintye; Soe that the defendant cannot con-
ceive that the Complaynant hath any other scope or intention in
this suite, but onely to vex, and molest this Defendant (havinge
had a long tyme of sicknes, and at this tyme being very sickely
and vnfit to followe suytes; and therefore the more likely in

his opinion, to yeeld to any vnreasonable demaundes (though there be noe iust Cause of Complaint;) and the rather because the matter in question (havinge slept these many yeeres, and the Company of Commedians that are supposed in the *plaintiffes* bill to haue contracted with him the said Defendant for the said *stuffes* (being since altered, and the parties separated and dispersed amongst other Companies) the sayd Complaynant findes it the more hard for him, to satisfie himself of the said Complayn^{tes} vniust demaundes, and therefore he settes vpon this Defendant (being a settled Inhabitant neere vnto him, and the likeliest to be answerable for whatsoever he seekes to recover). for which cause, and for these other imperfections in this bill, he verily hopes, and humbly prayes, to be Discharged from makinge any further answer, and to be dismissed wth *Costes*, And yet neuertheles (saving to himself the benefitt and advantage of these, and all other iust exceptions, for better manifestation of the truth, and satisfaccion of this honor.^{ble} Court, he further answereth and saith that true it is that about the time mentioned in the said bill, the said Defendant was one of the said Company of Comedians attendinge vpon the late Queenes Maiestie vntill after her Ma^{tes} Decease, he entred into the service of the most noble Prince Charles/ at which time, whatsoever others of the societie ought vnto the Complaynant) he this Defendant Did owe him nothings, neyther Did he ever sythence nor before to his knowledge question with any of them who should be his paymaisteres (as he in his bill vntruly informeth, but that there were at that time tenne of that Company (whereof the said Defendantes were fower) were sharers wth the rest and that their vsuall manner was, that sometymes one, and sometymes another of the said Company Did provide Clothes and other necessaries for the settinge forth of the actors of that Company; And that what parcelles of *stuffes* or other provisions the rest of them bought or procured for them, he this Defendant is alltogether ignorant; but for his owne *particular* he Directly answereth and saith, that he Did never request the said Complaynant to Deliver

vnto him or any assigne of his any such tinsell *stuffes* or other *stuffes*, but such as he bought for himself or his Children, for which he allwayes payd ready money; Nor did ever promise vnto the Complaynant, or any other to paye the sayd some of ffortye six poundes five shillinges eight pence mentioned in the said bill, nor any parte thereof; Neither did the said Comp.^t Deliver any such *stuffes* vnto the said Defendant, nor any other by his appointment, nor (as farr as he knowes) to his vse, as in the sayd bill is vntruly alledged/ And further saith, that he this Def^t, Did never make agreement with the sayd Complaynant to paye the sayd *somme* of xlvi.^l v.^s viii^d, or any other *somme* or somes of moneyes, for the said *stuffes*; Neyther Did the sayd Defendant Beeston *pervse* the sayd Complaynantes bookes of accompte, nor did by that meanes, or any other, vnderstand that any such *somme* or somes of money were due vnto him (other then what he the sayd Defendaunt paid ready money for, as is aforesaid/ Nor Did he the sayd Defendant ever promise to make vnto the said Complaynant, any payment or satisfaccion for the said *stuffes*, Nor did Combine with the rest of the defendantes or any of them, to defraud the sayd Complaynaunt of the said moneyes, nor any part thereof; Neither Did he the sayd Defendant direct any, to give out that the sayd moneyes were formerly payd vnto the Complaynant, as is vntruly laid downe in the said bill./ And further he the sayd Defendant Denyeth that ever he enticed away the sayd Thomas Chambers mencioned in the sayd bill to be the Complaynantes servant/ Whereby he should forsake his sayd Maister, or absent himself (of purpose) to Disable or disarme him of meanes to proove the matter in demaund nor for any other purpose whatsoever, for that (to this Defendantes remembrance) he never knewe the said Chambers in all his lief; All which thinges are vntruly informed in the sayd bill of Complaint, without that, that any other matter materiall in the sayd bill to be answered vnto, and not Confessed nor avoyded, traversed or denied, is true; All which he this Defendant is ready to averr and proove, as this honorable Court shall award; And therefore humbly

prayer (as formerly he hath don) to be dismissed with his reasonable Costes and Charges in this suite wrongfully sustained.

H. Gosnold:

Witness Book, Easter Term, 18 James I, vol. 200.

John Smythe	}	Tho: Somerscales gent
pl		William ffreshwater
Xpofor Beeston		Japhath Weale
gent def ^t		John King/

Court of Requests Proceedings, Uncalendered, James I. [May, 1620.]

INTERROGATORIES

Interrogatories to be ministred vnto witnesses to be produced on the parte and behalfe of John Smith plt against Christopher Beeston defend^t

- 1 Inprimis whether doe you knowe the parties, *plaintiff* and defend^{tes} or either of them
- 2 Itm whether doe you knowe that the defend.^t Christopher Beeston in or about the yeare of our Lord God One thousand six hundred and twelve did request the complainant to deliver from time to time vnto the Companie of Players for the time then being at the Redd Bull in S.^t Johns streete diverse tinsell stuffes and other stuffes for their vse in playing or what contract or promis did the said Beeston make vnto the *plaintiff* concerning any such stuffes to be delivered to the said Companie or vnto any of them and about what time
- 3 Itm whether doe you know who did vndertake for such wares or stuffes or other things as were from time to time in the yeare of our Lord 1612 and soe afterwardes for diverse yeares delivered vnto and for the companie of Players aforesaid and vnto their vse and in whose name and by whose directions were all or anie such wares or stuffes provided

- 4 Itm vnto whome did the said Companie give any allowance for or towards the satisfyinge of the said stuffes or any of them and what allowance did they give vnto any person or persons and vnto whome and at what time and in what manner did they allowe the same
- 5 Itm how long did the said Companie continewe together after the *plaintiff* began to deliver wares vnto them and when did they disperse or seperate themselves and whoe had the apparell or other things which were made of the stuffes which the *plaintiff* delivered vnto the said Companie or vnto whose vse were the same Converted and by whose appointment or what became of the same.
- 6 Itm whether hath not the defend Beeston lately *perused* the *pltes* booke or bookes of *parcelles* wherein the said stuffes were expressed and set downe and about what time and to what valewe did the same stuffes amount vnto at the rates therein sett downe and whether did the said Beeston acknowledge the receipte thereof and allowe of the rates and prices according as they were sett downe in the said bookes and what did the same amount vnto and what speeches did the said Beeston then vtter or speake concerning the same
- 7 Itm whether is the booke of *parcells* wherein the said stuffes were sett downe which were delivered by the *plaintiff* vnto the said companie now shewed vnto you and whether did not the said Beeston *peruse* the same and allowe thereof and whether was not the said Booke then when the said Beeston *perused* or allowed of the same as the same now is and what can you say concerning the *contentes* of this interrogatorie./
- 8 Itm what speeches did the defend.^t Beeston at any time vtter since this suite commenced touching the putting in of his answer or anie faulse answer into this Court declare the whole knowledge herein./ And did not the saide Beeston say that it twas not punishable
- 9 Itm whether doe you knowe that the defend^t Beeston made paym.^t of any some or somes of money *parcell* or in *parte* of paym.^t of any such stuffs delivered vnto the said companie and how much

thereof hath he payed vnto the plaintiff or vnto anie of his servantes or vnto any for his vse./

Court of Requests Proceedings, Uncalendered, James I. [5 May, 1620.]

DEPOSITIONS.

Depositiones Captæ apud Westmonasterium quinto
 Ex parte die Maij Anno Regni domini nostri Jacobi Angliæ
 Querentis. / Regis &c xvij^{uo} et Scotie liij^{tio} 1620. / ex parte Johis
 Smith Querentis versus Christofer Beeston def.^t/

Thomas somerskales of the parysh of S.^t Michell Bashingshawe
 London Armorer of thage of xlv yeres or thraboutes sworne,
 and produced to be examined vpon the 1-6. 7. Jnter the day
 and yeare abouesayd deposeth and sayth./

- 1 To the first Jnter this dep^t sayth he knoweth the parties plaintiff
 and def.^t/
- 6 To the vjth Jnter this dep^t sayth that the def.^t Beeston hath lately
 (viz^t since the beginning of the suite now dependinge between the
 def.^t and the now Comp.¹) scene and perused, in the presence of
 this dep^t the pl^{tes} shopp book or Bookes of accompt; in w^{ch} book
 or bookes were sett downe and expressed diuerse & seuerall
 parcelles of Tynsell stuffe and oth^{er} stuffes, w^{ch} the sayd defend^t
 Confessed to haue receyued from the compl^t in parte hym selfe
 and some parte therof, he the def^t had sent for by oth^{ers} &
 receyued lykewyse, w^{ch} sayd seuerall parcelles did accordinge to
 the rates therein sett downe amownt & come to the some of xlvj.¹¹
 v.^s viij^d or thereabouts: All w^{ch} seuerall parcelles the sayd Beeston
 acknowledged the receipt of & allowed the rates & prises, they
 were sett att, by the sayd book or bookes of accompt aforesayd:
 And the sayd Beeston did then furth^{er} in the hearinge of this
 dep^t Confesse & say that he did beleyue in his Conscience, the
 sayd parcelles were truly sett downe & requested the Compl.^t to
 forbear to take an attachm^t owt of this honorable Courte,
 agaynst hym the def.^t & to doe his best Indeuo^r that some oth^{rs}
 of the Company might pay some of the dett behynd for the
 parcelles aforesayd./

7. To the 7th Inter this dep^t sayth that the book now shewed vnto hym at the tyme of this his examynacion, and whervnto the *examiner* of this Corte hath subscribed his Name to the page 81 ys the very same book wherein the *parcells* of stuffe aforesayd, delyuered to & for the def^t, were sett downe & w^{ch} the sayd def.^t Beeston *perused* and allowed of as abouesayd, w^{ch} sayd book was (to the best vnderstandinge of this dep^t & for any thinge he cann obserue in yt to the contrary) when the def.^t *perused* & allowed therof: the very same yt now ys concerninge the seuerall *parcells* of stuffes aforesayd, w^{ch} he this dep^t the rath^r beleyueth & knoweth so to be for that his name ys subscribed in the sayd book, to the foote of thacompt agreed vppon when the sayd beeston & the Compl^t, in the *presence* & hearinge of this dep.^t And more or otherwyse to this Inter this dep^t sayth he can not depose/

Thomas Somerscales

William ffreshwat^{er} of the *parysh* of S^t Buttulphes w^{thout} byshoppes gate *London* merchant Taylo^r of thage of lxxij yeares or therabouts sworne and produced to be *examined* vppon the 1-2. & 3. Inter. deposeth and sayth./

- 1 To the first Inter this dep^t sayth he well knoweth both the *parties* pl^t and def.^t
- 2 To the second Inter this dep^t sayth that the def.^t Christoph^{er} Beeston, abought the tyme menconed in thinterrogatory, viz^t in or about the yeare of o^r Lord god 1612. did bargaen for and bye *certen* *parcells* of stuffes as tynsell loome workes & such lyke of the comp^{lt} and did then request the comp^{lt} that If any the company or workemen belonginge to the play^{ers} at the Redd bull in S^t John Street did come of those stuffes he had bought of the Compl^t, or of any more or oth^{er} stuffe, for the vse of the sayd Company, that he the Compl^t shold delyuer them from tyme to tyme w^{ch} he the sayd Beeston the def^t then *promysed* to see discharged & payed for.
- 3 To the 3 Inter this dep^t sayeth that the def.^t Beeston did vnder-take for such wares & stuffes as were delyuered by the pl.^t vnto the sayd Company of play^{ers} in A.^o 1612. & so afterwards vnto

& in the yeare of o^r Lord 1616, And further this dep^t sayth y^t the sd stuffes w^{ch} were in that tyme deliuered by the Compl^t vnto the sayd Company or for *their* vse were from tyme to tyme deliuered to this dep^t & oth^{ers} in Beestons name and by his direccion & appoyntm^t, And that this dep^t sayth he knoweth yt so to bee for y^t he hym selfe beeing a workman to the sd company hath often & diuerse tymes gone to the pl^{tes} house, some tymes by direcon from the sayd Beeston & some tymes as sent by oth^{ers} of the sayd Company, for diuerse stuffes, w^{ch} they had occasion to vse. And when he hath asked the pl^t for the stuffes he was so sent for, the pl^t often tymes refused to deliuer the same to this dep^t, wthout some token from the sayd Beeston, wheryppon this dep^t hath diuerse tymes gone backe agayne wthout the stuffes to the sayd Beeston, and then the sd Beeston hath sent this dep^t agayn, some tymes by some token & some tymes hath sent wth hym this dep^t one or oth^{er} belonginge to the sd company for the thinges aforesayd, and then the pl^t hath deliuered the sayd stuffes from tyme to tyme to this dep^t to thuse of the sayd Beeston & his company. And more to this Inter he sayth he can not depose

Wm ffreshwaters.

Japhathe Weale of the parishe of Christchurch in Newgate markett London habberdasher of thage of 39 yeares or thereabouts sworne and examyned vpon the first sixt seaventh & nynthe Interr deposeth & saythe/

1. To the ffirst Interr this deponent saythe he knowethe the parties plaintiffes & defendt./
6. To the sixt Interr this deponent saithe he knowethe and was present when the defendt Beasten perused *the plaintiffs* booke of parcells wherein the parcells of stufte weare expressed that weare deliuered to the defendt & to his vse, and he soe perused the same booke in Ao. dni 1618. to the best Rememberance of this deponent; And saythe the parcells of stuffes soe perused by the defendt in the pl^{tes} booke did to the best Rememberance of this deponent amount to the some xlvj^{ll} or thereabouts; and saythe

that when the sd defendt soe perused the sd. booke he did acknowledge the Receipt of the said parcells and allowe of the rates and prizes as they weare there sett downe in the said booke/ And after he the defendt hadd soe perused the sd booke and acknowledged the Reciept of the sd parcells and allowed of the prizes as they weare sett downe in the sd booke he desired the Complt to haue patience for a while & he should haue his mony or wordes to that effect/ And more he Cannot depose to this Interr/

7. To the seaventh Interr this deponent saithe that the booke of parcell[s] nowe shewed vnto him this deponent at the tyme of this his examynacion & wherevnto the xamyner of this Cort hathe subscribed his name is the same booke that the deft soe perused & allowede of the sd parcells and that the same booke is wthout any alteracion concerninge that poynte since the sd defendt perused the same/ And more he Cannot depose to this Interr./

9. To the nynth Interr this deponent saythe/ he knowethe that the defendt since the perusall of the booke as aforesd towardes the foote of that accompt made paymt of the some of 36^s vnto the Comp^{lt} in part of payment of such some & somes of mony as was due vnto the Comp^{lt} vppon the foresaid booke; and noe more was payd to the sd Complainant or his servante or servantes to his vse since to the knowledge of this deponent And more he Cannot deponent, [sic] depose./ to this Interr

Japheth Weale

John Kinge of London gent of thage of fortie six yeares or thereaboutes sworne & produced to be examyned vppon the first, second, fourthe & sixte Interr the daye & yeare abouesd deposethe and saithe/

1. To the first Interr this deponn saithe he knowethe the parties pltfes and defendt/

2. To the second Interr this deponent saithe/ he knowethe that the defendt in or aboute the yeare of o^r Lord god 1612. did Request the Complt Smythe to deliuer from tyme to tyme vnto the Company of players for the tyme then beinge at the Redd Bull in S^t

John Streete, such parcels of Tynsell stuffes & other stuffes as the sd Company should vse in playenge and vndertooke to see him the Complaynant payd for the same, w^{ch} he knowethe to be true for that the Comp^{lt} would not deliuer any stuffes vnto any of the sd Company of players except they brought a tokne from the defendt Beeston./

4. To the fourthe Interr this deponent saithe that the sd Company gaue Allowance vnto the defendt Beeston for the satisfying of such mony as should be due to the Comp^{lt} for such stuffes; and saythe that the sd Company did allowe him the sd Beeston one half of the proffitt that came of the gallyryes; towards the satisfyinge of the Comp^{tes} debt w^{ch} he Received weekly accordingly but what it might amount vnto this deponent Cannot iudge, neither knowethe he aboute what tyme the sd Company gaue the defendt such allowance And more he Cannot depose to this Interr/
5. To the fifte Interr this deponent saithe that after the p^{lt} begann to deliue^r Stuffes vnto the sd Company the sd Company Contynued together for the space of eight or nyne yeares or thereaboutes, and saithe that they the sd Company begann to separate them selues, three yeares since or there aboutes; and at the separacion of the sd Company the sayd Beeston did take and Carry Away all the apparrell that was then amongst the sd Company and Converted them to his owne vse/ and since disposed of them to other Companyes at his pleasure And more to this Interr he cannot depose saue that he saythe that the stuffes bought of the p^{lt} weare all worne out & consumed before the separacon of the Company aforesd./

Jhum
King

Decrees and Orders, 17-18 James I, Vol 30, p. 324.

xxvj^{to} Die Maij a° &c 18° et 53°/

Smith
Beeston In the cause at the sute of Iohn Smith compl^t against Xpofer Beeston and others Def^{tes} vpon mocion made to this court on the behalf of the said compl^t y^t is ordered that the same matter shalbe

published vpon the second day of the next terme & heard in this court vpon theight day of the same terme if the said def^{tes} having convenient notice of this order before the sayd day of publicacion shall not then or in the meane tyme shewe good matter in this court to the contrary- /

Affidavit Book, 15-19 James I, Miscellaneous Books 130. [Not paged, and badly damaged.]

Termino Trinit A° R Regis Iacobi Anglie ffrantie et
Hibernie xvij° et Scotie liij°./ viz

xvj° die Junij A° praedc./

Smith
Beeston Towching the cause at the sute of Iohn Smith plaintif against Xpofer Beeston gent & others def^{tes}. The said Xpofer Beeston maketh othe that Emanuell Reade gent is one of this deponentes most materiall witnesses in this cause who about three weekes past went into Ireland, whose returne is not expected till some tyme in Michaelmas terme next-//

Decrees and Orders, 17-18 Jas I, Vol. 30, p. 428.

xvij° die Junij A° &c 18° et 53°-/

Smith
Beeston In the cause at the sute of Iohn Smith compl^t against xpofer Beeston def^t, vpon the mocion of m^r Jeffrey of counsaill wth the said def^t yt is ordered (any former order notwthstanding) in regard of the def^{tes} *Affidavit* that the publicacion of this cause shalbe deferred vntill *crastino animarum* next and the hearing thereof vntill the xijth day of novemb^r next, And at those dayes the same matter shalbe published & heard peremptorily- /

Affidavit Book, 15-19 James I, Miscellaneous Books, 130.
[Not paged, and badly damaged.]

Affidavit of Elizabeth Perkins.

xxvij° die Junij A° &c 18° et 53°/

Smith
Beeston Towching the cause at the sute of John Smith pl against xpofer Beeston def^t, Elizabeth Perkins (wief of Richard Perkins of

the parish of Clarkinwell gent) maketh othe that Emanuell Reade hath made his abode in Jreland by the space of two or three yeares last past or thereabouts with his wief & familie and about Easter last did come into England and did lye often tymes in the howse of the said xpofer Beeston & was much in his company whilest he was in England And about Whitson-tyde last the saide Emanuell Reade went againe into Jreland & at his departure he sayde that he thought he should never returne agayne into England

[*In eodem.*] *Affidavit of John Smith.*

Termino sci Michis A° R Regis Iacobi Anglie ffrantie
et hibnie 18° et Scotie liij°

Quarto die Novembris A° praedc.

Smith
Beeston Towching the cause at the sute of John Smith pl against xpofer Beeston def^t: The said John Smith maketh othe that Xpofer Beeston and this Depon^t having some conference together about Michaelmas terme 1619 concerning the putting in of Beestons answer the sayd Beeston did then say that it was nothing for him to put in a false answer into this Court of Requestes, for that it was not punishable, And this deponent made him answeere againe that if the lawe would punish him for it he should be punished —/—/

[*In eodem.*] *Affidavit of John Smith.*

xiiij° Die Novembris A° praedc/

Smith
Beeston Towching the cause at the sute of John Smith pl against xpofer Biston def^t: The said compl^t deposeth that about Midsomer 1619 this depon^t came to the said Biston to demaund his debt, And the said Biston sayde that he would pay his part, & desyred this depon^t to demaund the rest of the companie w^{ch} to satisfy him, this Depon^t did. But their answeere was they ought him this compl^t nothing But the said Biston was to pay him Then this compl^t tolde the said Biston their answeere and sayde he would profer his bill in this ho: Court that both Biston and the companie might answeere vpon their othes w^{ch} of them ought to

pay this compl^t And the said Biston & the company were both contented & requested this compl^t to take the sayd course—/

IV.

THE FORTUNE THEATRE AND THE BEAR GARDEN.

The part played by the Fortune theatre and the Bear Garden in the evolution of the drama of Shakespeare's time cannot properly be told until we are in possession of all available data. The chief items formerly known, besides not a little new matter, I have presented in *University Studies* for April-July, 1908, as incidental to the treatment of *The Children of the Chapel at Blackfriars 1597-1603*. Old materials and new must ultimately be gathered together and presented, not as mere isolated facts, but as essential members of a living, palpitating organism. But it is my purpose now to do no more than add certain new facts that will finally fall into their proper relations in later presentations of other literary historians as well as my own. It has long been known that Edward Alleyn, within a year after he built the Fortune, leased one half of it to his father-in-law, Philip Henslowe. The lease bore date 4 April, 1601, and was to continue twenty-four years at an annual rental of 8*l*. An unexecuted assignment of it, after Philip Henslowe's death, in 1616 by Agnes Henslowe, his wife and executrix, is now preserved among the voluminous papers of Alleyn and Henslowe at the college founded by Alleyn at Dulwich. The papers there preserved furnish us some of our most valuable information on the Elizabethan-Jacobean drama and stage. But among them the lease itself has not been found, nor any record of payments of rent from time to time by Henslowe to Alleyn for the Fortune.

It is evident from the documents I now present that no payments in money were made by Henslowe for the rent of one half of the Fortune. It was simply offset by rent of other property to Alleyn. It is here stated that an agreement was made in or about 1610 whereby Alleyn released Henslowe from payment of the 8*l*. in consideration of Hens-

lowe's allowing Alleyn residence at the Bear Garden in Southwark. But there can be little doubt that the payment of rent had been similarly offset from the very beginning of the lease in 1601.

The suggestions in the document concerning unknown features of the Bear Garden, Alleyn's long residence there, and the later relations to William Henslowe, brother and part legatee of Philip, may turn out to be more than merely interesting. I choose to present at present only this one out of a series of documents relating to the same persons and theatres. All emit an occasional glimmer of light, and in due course shall be published.

ALLEYN VS. HENSLOWE.

Court of Requests Proceedings, uncalendered, James I.
[1624.]

ALLEYN'S BILL.

[Bill only. Crumpled and stained, but legible.]

[Date of filing, *in dorso*] xxxj^o die Januarij Anno Rni
Regis Iacobi [Angl] fr et hibernie xxj^o, et Scotie lvij

Defend vocet^r per nunc Camer

To the Kinges most excellent
Ma^{tie}

In most humble wise Complayninge sheweth to your most excellent Ma^{tie} your trewe ffaithfull and obedient subiecte and servaunt Edward Allen of Dullwich in your highenesse Countie of Surrey Esquire. That wheare as in or aboute the eight yeare of your Ma^{tes} most happie and prosperouse raigne over this your highenesse Realme of England theare was Covenauant Contract Conclusion and agreement made betweene one Phillippe Henslowe late whiles hee lived of the parish of S^t Saviours in the said Countie of Surrey Esquire deceased and your subiecte that one yearelie rent of eighte poundes dewe and payeable to your subiecte his executors and assigns by the said Phillipp Henslowe for the tearme of ffoure and Twentie yeares then to come and yett vnexpired for the moyetie of a house Comonlie Called the

ffortune Playehouse and other tenementes thearevnto adioyninge scituate and beinge in Goldinge Lane in the County of Middlesex should from thence be released and dischargd by your said subt to the said Phillipp Henslowe his executors and assignes, w^{ch} rent of eighte poundes *per annum* your subiecte did accordinglie release to the said Phillippe Henslowe in his liffe tyme and did ffree and acquite him his executors and assignes from the payement thearof, and for Consideracion hearof the said Phillippe Henslowe did Covenaut and agree wth your said subiecte that hee the said Phillippe Henslowe his executors and assignes that your said subiecte or his assignes wth ffoure seruaunts should or might haue the vse or occupation of a Certaine messuage or tenement wherin your said subiecte then dwelt beinge parcell of a messuage or tenement Comonlie Called the Beare garden and the newe buildinges then latelie built before the same scituate and beinge in the parish of St Saviours in Southwarke aforesaid for your subiecte his assignes or seruauntes necessarie or Convenient Lodginge wth the vse of the kitchen of the same messuage or tenement for dressinge of his or their meate washinge or other necessaries wth ingresse, egresse and regresse into and from the same att his or their wills and pleasure duringe the rest and residewe of the said tearme of ffoure and twentie yeares then to comme and vnexpired wthout anie rent or other recompence to be yealded or payed for the same other then the release and dischargd of the said yearelie rent of eighte poundes payeable to your subte by the said Phillipp Henslowe as is aforesaid and wthout the lett disturbaunce moles-tation, expulsion eviccion or interrupcion of the said Phillippe Henslowe his executors or assignes or of anie other person or persons by his or their meanes, mighte, Title, estate, interest, Consent or procurement, And your subiecte did accordinglie hold and enjoye the said messuage or tenement wherin your subiecte then dwelt and the vse of the said kitchen quietlie and ffreelie duringe all the liffe tyme of the said Phillipp Henslowe w^{ch} was about ffive yeares after wthout yealdinge or payeinge anie rent for the same to the said Phillipp Henslowe other then the release and dischargd of the said yearelie rent of eight poundes to the

said Phillippe Henslowe his executors and assignes, And afterwards (that is to saye) in or aboute the sixth daye of Januarie in the thirteenth yeare of your Ma^{tes} said raigne the said Phillipp Henslowe did make his last will and testament in wrytinge and theareby did bequeathe or devise the interest of such landes and lease w^{ch} hee had and helde vnder the Bishopp of Winchester and the tearme of yeares thearin to Comme to one William Henslowe brother of the said Phillipp Henslowe, the said messuage or Tenement whearin your subiecte dwelt as aforesaid and the said kitchen beinge parcell of the said landes w^{ch} the said Phillipp Henslowe did then hold by lease vnder the said Bishopp of Winchester, and which the said Phillipp Henslowe did geve and bequeathe to the said William Henslowe as aforesaid, And the said Phillipp Henslowe shortlie after in the said moneth of Januarie in the said thirteenth yeare of your ma^{tes} said raigne dyed theare beinge then aboute fffitie yeares vnexpired of the said lease, wheareby the said Phillipp Henslowe did hold the said landes vnder the Bishopp of Winchester, And the said William Henslowe by vertue of the said guifte and bequest made vnto him of the same landes by the last will and testament of the said Phillipp Henslowe did enter into and possesse himselfe of the same landes wheareby hee allsoe was and is possessed of the said messuage or tenement whearin your subiecte dwelt and of the said kitchen and doth receive and hath received the rentes issues and profittes thearof ever sithence the death of the said Phillipp Henslowe But nowe soe it is maye it please your most excellent Ma^{tie} that the said William Henslowe doth very vniustlie and Contrarie to all equitie and good conscience deteyne and hath deteyned ever sithence the death of the said Phillippe Henslowe from your said subiecte vnder Collour of the said guifte or bequest made vnto him by the said Phillipp Henslowe the said messuage or Tenement whearin your subiecte dwelt as aforesaid and the vse of the said kitchen the said Tearme of ffoure and Twentie yeares beinge yett vnexpired and not determined wthout anie allowaunce or recompence made or geven to your Subiecte for the same and doth allso vtterlie refuse and denie to geve your said subiecte

anie allowaunce or recompence for the same Notwthstandinge that the said William Henslowe doth well knowe that the said Phillipp Henslowe for the Consideracion aforesaid did Covenaut Conclude and agree wth your said subiecte that your subiect and his assignes wth ffoure servauntes should or might haue the vse and occupation thearof in manner aforesaide duringe the rest and residewe of the said tearme of ffoure and twentie yeares then to come and vnexpired. Nowe for that your said subiecte hath noe meanes by the stricte Course of the Common Lawes of this Realme to recover the possession of the said messuage or Tenement wherin your subiecte dwelt and the vse of the said kitchen or the rentes issues or proffittes thearof ever sithence the death of the said Phillipp Henslowe, and doubteth not but that the said William Henslowe will sett fforth vppon his oath the saide Conclusion and agreement made betweene your said subiecte and the said Phillippe Henslowe. Maye it thearefore please your most excellent Ma^{tie} to graunte to your saide subiecte your Maiesties most gratiouse writt of privie seale to be dyirected to him the said William Henslowe Commaundinge him theareby personallie to be and appeare before your Ma^{tie} and your Ma^{tes} Councill in your Ma^{tes} Chamber of Whitehall att Westminster then and theare to aunswere the premisses vppon his oathe, and to stand to such order and Censure thearin as to your Ma^{tes} said Councill shalbee thought meete and Convenient. And your subiecte as dewtie bindes him shall ever praye for your Ma^{tes} most happie and prosperouse raigne longe to Continewe over vs /

Ro: Gosson

Affidavit Book, 21 & 22 James I, Misc. Books 132.

*Termino sancti Hillarij A° R Regis Jacobi Anglie
ffr: et hibernie xxj° et Scotie lvij°-/*

Quinto die ffebruarij a° &c 21° et 57°./

^{Allen}
^{Henslowe} Towching the cause at the sute of Edward Allen esq^r plaintifff
against Willm Henslowe def^t Thomas Mowsherst of Maresfeild
in the county of Sussex yeoman aged lvj yeares or theareabouts

maketh othe, that the sayd def^t Willm Henslowe is an aged man, about the age of three-score and eight yeares, and hath been sick ever sithence the feast of S^t Bartholomewe last past & seavenight before vntill this *present* tyme, & yet is very sick & weake & keepeth his bed not able to helpe himself, And that the said def^t by reason of his long sicknes is become deafe, & his sences & vnderstanding so decayed that he cannot well heare nor vnderstand the said compl^{tes} bill (being read vnto him) to make answere therevnto.—//

The English Lyric: A Study in Psycho-Genesis

BY HARTLEY BURR ALEXANDER

I. ETHNIC CHARACTER

The mental complexion of a race, no less than that of an individual, is most characteristically mirrored in its artistic achievement. Throughout the history of civilization what has given tone and quality to every effective culture has been, more than all else, its art. The aesthetic impression produced by a race and its works is always lasting indication of its vital force.

Nowadays when we think of Greek civilization the image first to present itself is of urns and vases of graceful line, or of wonderful marble statuary, or of fine-limbed temples gleaming white above the blue waters of the Aegean. Always it is some beauty of plastic form, luminous, exquisite, less a thrilling of the imagination than a rest in radiant charm. Contrast with this the culture of Italy. The Renaissance! Our one overmastering estimate of the Italian race is determined by that period of its history in which it developed an habiliment of sensuous splendor for its ideas and its ideals such as has never been attained by any other people. Its mere wealth of color and tone stimulate the imagination to undreamt vision. The spirit of it, also, is in part revealed to us, and this because we are not wholly alien to the ideals it was concerned in expressing. The Renaissance was Italian in its sensuous magnificence, but its motives were European, Occidental, and so not out of sympathy with our own. Understanding is, indeed, quite as essential to aesthetic appreciation as is stimulation of sense through beauties of color and form. Oriental civilizations seem all more or less foreign and unnatural to us. Though here, as with the more intimately com-

prehended Greek and Italian cultures, it is the aesthetic aspect that most vividly impresses us, still the impression is not so vital nor so close. There is richness and sensuous variety in Oriental culture not unlike that of the Italian, but it does not appeal to us with the same pertinence. We do not comprehend a cast of mind so thoroughly alien in vision; we cannot touch the human motive that actuates its expression; the psychical reality, the ideal, which is the reason and worth of the creation, is hidden from us, and we have no art to read the mind's complexion in features not transfigured by the sympathy that springs from community of culture.

Now just as we understand other peoples best through their artistic expression, so may we best understand ourselves in our own aesthetic tastes and achievements. To be sure, we, as all modern peoples, have borrowed freely from the cultures that have historically anteceded ours, and consequently there are many elements and influences in our work which represent an assimilated and not a native taste. Nevertheless these are mainly superficial, having to do with form rather than spirit,—which not the most imitative art can wholly conceal. No matter what one race learns from another, its work is bound to be imbued with a turn and temper native to the flesh; and where this is perceived, therein is discovered the portraiture of the art.

Ethnologists tell us that the English people is the product of a highly complex fusion of races. An understratum of Iberian blood; an infusion of Celt; and out of the two the Briton of the era of the Roman occupation. Later the Teutons,—Angles, Saxons, Norwegians, Danes, Normans. From all these arises the modern Britisher and British-American, quite inappropriately called Anglo-Saxon. But however great the variety of races, the time of first fusion is now so long passed that a thoroughly characteristic type has been developed. It is Teuto-Celtic rather than Anglo-Saxon; for in the modern Briton are united two distinctive trends of character and temperament probably not wrongly accredited to a Teutonic and a Celtic element (if Caesar's Briton was indeed a Celt). The two strains may be clearly distinguished, and they are important factors in any

understanding of British psychology. Yet they do not represent two types of individual, for their fusion has produced a new and distinct personality having temper and tone not difficult to recognize nor wrongly to be accounted unitary.

For seeing what that temper is, because it is so common to us, we may best contrast it with types that strike us by reason of their divergence from it. The Italian mind we conceive to be richly and vividly sensuous, delighting in color and sound and all the joyous stimulation of a brilliant vitality. The Gallic mind we think of as keenly logical and quick, dramatic in all the stagings of its thought, clear-bounded even in emotion. The German we take to be ponderously profound, studiously careful, tenderly sentimental. But our own mind shares with none of these. Compared with them, we find its most striking feature is its repression. It is dumb even to itself, slow to understand itself, and when it does understand, however stubborn in conviction, it is never facile in expression. The repression is thus not a stoical reticence, and it is far less willed than imposed by nature. In common with all mankind we desire self-expression, but it is only attained by us with labor; we never quite conquer the awkward age. Hence our admiration for the to us difficult art of oratory—so spontaneously the gift of the gesticulating Latin,—and hence, too, our failure to comprehend the somewhat pluvius emotion of the German.

But in the mere fact of repression we have only a negative and barren characteristic. Our interest probes deeper. We know, for example, that we possess natively a full portion of Northern gloom of mind, an oppression under destiny which impels us to take even joys sadly. In half antithesis to this, we recognize an almost exuberant practical idealism, the spirit which can exalt the average human life to highest worth,—as in the democracy we believe in, and aspire to, and by reason of a magnificent faith partially attain. Other qualities and other features we know, too, but this struggle of idealistic faith with the anciently destined sorrow of our mood is perhaps most fundamental. That it is tight-pent, because of our natural repression, renders the struggle more intense and at the same time gives the

characteristic quality to our expression, when expression is vouchsafed us. Strongly metaphorical because the half-truth of metaphor conveys the confusion as well as the strength of the high-wrought mood; spontaneous and brief because of the turbulence within the pent source: these are the natural qualities of our most native expression, and it is perhaps needless to say that they are essentially characteristics of lyrical expression. At least, in a type of mind conceptually rather than sensuously imaginative,—which will therefore give its art a literary form,—these qualities demand the lyric; and with due deference to Shakespeare and Elizabethan drama, it appears to me certain that it is just in our lyric literature that the most genuine embodiment of English character and genius is to be found.

II. POETIC MODE

Race and culture (and in culture I include all that grows out of language and tradition) furnish medium and background of poetic expression. They enrich the poet's personality, his character and experience; they supply him with an audience of kindred understanding; they enable fullness and surety of utterance arising from the reflection of his life and mood in the larger life of his people. Individuality thus comes to mean a fine precipitation of what marks the essential character of race or culture: in mood it is an acute delicacy of response to underweaving instincts; in expression it is a lively mirroring of cultural shadow and tone. The quality of expression to which in these guises it gives occasion Matthew Arnold called *mode*,—thereby indicating a something more than manner though less than mood, something partly of the nature of method but instinctive and fixed in the blood.

In that noteworthy essay on *The Study of Celtic Literature*, Arnold distinguishes three modes of English poetry which he ascribes to three cultural sources, two native to the race and one appropriated from without. The native modes are a Celtic and a Saxon, the one appropriated is the classical.

First, though our author assigns to it last appearance in our

literature and the least fundamental character, let us consider what he calls the Greek "luminous" mode. Its salient qualities are startling clearness of profile, bell-like purity of tone, a lambent sunniness of atmosphere, and in sentiment a delicate expressiveness most lovely because so utterly free from introspection and its attendant modesties. In illustration Arnold cites Theocritus:

λειμών γάρ σφιν ἔκειτο μέγας, στιβάδεσσιν ὄνειρα.¹

With which he might well have set the exquisite fragment from Sappho's description of the garden of the nymphs, wherein is centered all the drowse and dream of the *Lotos-Eaters*:

ἀμφὶ δὲ ψῦχρον κελάδει δι' ὕσδων
μαλίνων, αἰθυσσομένων δὲ φύλλων
κῶμα κατάρρει —

which John Addington Symonds translates:

All around through branches of apple-orchards
Cool streams call, while down from the leaves atremble
Slumber distilleth.

From the English he cites Oberon's description of Titania's couch:

I know a bank where the wild thyme blows,
Where oxlips and the nodding violet grows,
Quite over-canopied with luscious woodbine,
With sweet musk-roses and with eglantine.

And again, Keats:

What little town, by river or seashore,
Or mountain-built with quiet citadel,
Is emptied of its folk this pious morn?

¹ *Idylls*, XIII, 34. So cited by Arnold. Paley and other editors read the verse

λειμών γάρ σφιν ἔκειτο, μέγα στιβάδεσσιν ὄνειρα

—"for they found a meadow lying, rich in couches of strown grass and leaves" (Lang).

In all of these examples we can clearly grasp the impulsive delight in mere perception which, transfiguring the object of perception, gives rise to the luminous quality. And most appropriately is it likened to light: it is imaginative illumination. But I think, rather than merely classical, the mode is elemental in all poetry. In quality it is nearest akin to child imagination,—eager, active, snared in the filmiest web of sunshine, ever discovering new wonder in what to the tired mind of maturity is only the commonplace.

We find it pervading children's poetry and we find it in primitive song everywhere. Lafcadio Hearn has given us dainty bits from the poetry of old Japan quite rivaling the Greek.² Thus in comparing Japanese and Greek appreciation of the poetry of insect life, with the beautiful lines of Meleager,

O cricket, the soother of slumber . . . weaving the thread of a voice that causes love to wander away! . . .

and,

Thou vocal tettix, drunk with drops of dew, sitting with thy serrated limbs upon the tops of petals, thou givest out the melody of the lyre from thy dusky skin. . .

—with these, Hearn may justly set for nicety of observation and delicacy of sentiment this on the *aburazémi* (a variety of cicada),

Speaking with that voice,
Has the dew taken life? . . .
Only the *aburazémi*!

And in,

Fathomless deepens the heat: the ceaseless shrilling of *sémi*
Mounts, like a hissing fire, up to the motionless clouds. . .

Hearn gives us a startling parallel to the Alcaean fragment on the cicada preserved to us by Demetrius:

From beneath his wings a shrilling song he pours—
High fluting that to fiery heights upsoars.

² *Shadowings*, 1900.

In the song from the province of Iwami, the song of a lover seeking the trysting-place, a more romantic note is struck:

Ah, the darling! . . .
 Ever as I steal along the ricefield path
 The firefly kindles a light to show me the way . . .

And even this, with its flavor of conceit, may perhaps bear comparison with the nobler conceit of the epigram ascribed to Aristocles, the son of Ariston, before he became known as the Plato who would banish poets and poesy from his City of the Wise:

*ἀστέρας εἰσαθρεῖς, ἀστὴρ ἐμός· εἶθε γενοίμην
 οὐρανός, ὡς πολλοῖς ὄμμασιν εἰς σέ βλέπω—*

which in English runs naturally into a little sibilant song:

Thou gazest on the stars, my star? . . .
 And 'tis O that I might be
 Yon starry skies
 With myriad eyes
 To gaze on thee!

In Greece and in Japan we find the same primordial pleased amaze that a world could be so fair; and if the classic peoples preserved it undefiled into the highest culture, keeping always in the "white light," as Professor Woodberry puts it, this was rather because of the exceptional sun-delight of their natural domain than because the mode was exclusive possession of their race. It was in English poetry long before the Renaissance. Plus a humorously genial insight into men and affairs it is the chief poetical asset of Chaucer; and every poet, no matter to what agonies of introspection or grimness of message he may later attain, must first have possessed as his poetic birthright this divine child-joy.

But if the luminous mode nourishes the root of poetic aspiration, it by no means determines the form and fashion of the flower. There are all-important conditions of environment, of racial predilection, of education and the mould of natural circumstance. The poetry of the Japanese is not, after all, that of the Greek: Fuji-yama and Buddha demand oracles other than

Dodona and Delphi; the rude ballad of Robin Hood's Alan a Dale is only remotely akin to the courtly romaunt of Coeur de Lion's Blondel; and ever there has been one song echoed from mountain and mist, quite another from green dale and blossoming hedgerow.

The clear-seeing eyes of the poet find the fundamental tone of poetic composition everywhere but atmosphere and perspective follow environment and age-old heredities. All true poetry is luminous, but the scenes that are shot with light vary indefinitely. Some are almost trans-sensibly perspicuous,—and this is the classical, the Mediterranean mode; some are revealed through intermittent and blinding flashes, scenes of cosmic indefiniteness and awe,—and this is the Teutonic, the Northern mode; some are perpetually ashimer with the mystic "light that never was on land or sea,"—and this is the mode of the Celts of the ultimate West.

Yet each of these—Greek, Saxon, Celtic,—develops from the same Aryan heredity. The studies of the past quarter-century have penetrated far into the depths of that old racial mind—pre-Hellenic, pre-Teutonic, pre-Celtic,—the mind of primitive Europe whence the European civilizations have been unfolded. In this old mind we meet that common fond of ideas and ways of seeing what we call our world which is the basis of the unity of European thought as we know it today. The picture we have of this mind, reconstructed from the debris of folklore and from slow-dissolving custom and speech, is lurid rather than attractive; for it is mainly a murk of ghost-ridden superstition, with its grim attendance of human sacrifice and half-remembered cannibalism, this and the hardly less gruesome and fierce ritual of a spirit of the corn to whom man's blood must be yearly rendered up in return for the yearly dole of food. Placation of the hovering and vengeful souls of the human dead and compensation, life for life, to the great Earth Mother of us all, who must devour that she may feed,—these are the primal dogmas of old Europe, living-dead in us yet; and it is out of these that is sprung that curious *mélange* of ideas of shape-shifting men and talking beasts,

of daemons of earth and air and sea, of giants and Titans and the wars of gods and men, which are the substance and life of our folktales;—aye, and it is out of these that sprung, half by miracle, the vision of an immortal life, and of a destiny-conquering man.

And with the wild phantasy of these beliefs we have to reckon in any account we may give of the spiritual development forth-shown in any European literature. We have to reckon with it . . . but rather as the background, the *hinterland* of the forward thought, than as its determinant. It is a background that is valuable, first, as a ground of comparison for the different modes that have developed upon it, and second, as the secret and spring of that like-mindedness which enables Europeans of diverse culture-traditions to comprehend and sympathize with one another. As, for example, it is great profit to compare what is made of the idea of Fate by Hellene and Teuton respectively, the Nemesis of the one a moral principle, Righteous Indignation, the Wyrd of the other a Valkyrie-like Snatcher of Souls, implacable, wrathful; or, again, to contrast the clodlike Jotunn of the Northman or the malignant man-devouring Fomor of the Gael with the Titan of the brighter myth of the South, the Titan who may be a Prometheus and a champion of mankind, his Earth-born kin.

Against the murk background, what we must seek in each is the distinctive light which each race develops in its own habitation.

III. THE GREEK MODE

Let us once again consider this "luminous" Hellenic mode which plays so profound a rôle in the development of all European literature.

"The 'serene and classical' Greek of Winckelmann and Goethe," says Gilbert Murray, "did good service to the world in his day, though we now feel him to be mainly a phantom. He has been succeeded, especially in the works of painters and poets, by an aesthetic and fleshly Greek in fine raiment, an abstract Pagan who lives to be contrasted with an equally abstract early Christian or Puritan, and to be glorified or mishandled accord-

ing to the sentiments of his critic. He is a phantom, too, as unreal as those marble palaces in which he habitually takes his ease. . . . There is more flesh and blood in the Greek of the anthropologist, the foster-brother of Kaffirs and Hairy Ainos. He is at least human and simple and emotional, and free from irrelevant trappings. His fault, of course, is that he is not the man we want, but only the raw material out of which that man was formed: a Hellene without the beauty, without the spiritual life, without the Hellenism."

The "raw material out of which the man was formed" is much the same for Greek and Saxon and Celt, yet each of these is formed, and formed into his own kind of man in a unique and individual sense.

And what, then, is the uniqueness of the Hellene? or, to put the question in a less ambitious and more apposite form, what is the distinctive quality of the Hellenic mode, the classical spirit, in literature? We have dissented from Arnold's dictum that it is mere light, mere luminousness,—rather it is a special degree of light, steady and pervasive like the light of day, restricted in its avoidance of the prismatic play of shadows, the still and constant "white light" of Professor Woodberry.

In her brilliant *Prolegomena to the Study of Greek Religion* Jane Harrison forcefully brings home "the fact that Greek religion for all its superficial serenity had within it and beneath it elements of a darker and deeper significance"—pallor and trembling in the presence of dark underworld powers and that sickness of soul which arises invisibly from the miasma of superstition. Behind the brilliant cults of the civic gods and goddesses—Wardens and Warriors of the Hellenic states,—hung a sombre array of Chthonian deities, whose rites were done at night in caves and dens, the one wish of the worshippers being to avert the malignancy of powers ever unconquered though ever held suppressed.

In Greek literature there is little explicit reference to this suppressed chapter of mythology,—a chapter having to do with mysteries and obscure rites and things only darkly to be hinted. On the surface are the bright and friendly Olympians, with Zeus,

the shining heaven, lording it over all,—daylight and zestful action everywhere. We may surmise dim genealogies of monster deities from the picturesque Sileni and Satyri whose final function is but to emphasize the wholesome humanity of the regnant gods; but the grim and raw reality of their being is rigorously repressed.

The sociableness, the intense humanness of Greek religion is thus due to the fact that it is, in its palpable aspects, an *expurgated* religion; and, with no less truth, that brightness which makes Greek literature the model of humanism is due to the fact that it is spiritually an expurgated literature: the darker, the more monstrous, the more distempered phases of experience are eliminated as by an instinct more careful than care; so that we gather from it an impression only of lambent and generous sunlight.

This is our first impression, but we have to acknowledge too a sense of power—elastic as in Homer, terse and willful as in Aeschylus, broad and gracious as in Plato. And a momentary reflection tells us that this powerfulness of the literature is due to the same cause as its impression of light: to the fact of *repression*. We feel the substructure implicit in the revealed thought; we keep only in the “white light” but we are never left without some consciousness of Cimmerian shades, of the cosmic envelop of the soul.

Art and conduct, ethics and aesthetics, are only two manners of manifesting the same under-dominating character. And if we look into Greek ethics we find at once the parallel to this power-through-repression which is manifested in the literary, as indeed in all Greek art. The clue to it is to be found in the conception of virtue, *ἀρετή*, which Aristotle defined as a mean, a mean relative to ourselves, as human beings gifted with judgment and choice, avoiding on the one hand the distemper of passion, on the other the spiritual malformation of ascetic denial. The ready maxim, *μηδὲν ἄγαν* ‘Nothing too much,’ and the ever-praised *σωφροσύνη*, ‘Temperance,’ show how much the Greeks feared excess, how ardently they admired restraint, in the conduct of men; and no less is this shown in their constant dread of *ὑβρις*, that insolence of mortal pride which is the very essence of impiety.

“The things of mortals best befit mortality,” sang Pindar; and

Protagoras proclaiming "Man is the measure of all" but gives us the obverse inscription, diminishing the world to mortal compass rather than expanding the human to the Titanic.

And so we get, through restraint and repression and the mastery of self which these imply, that intense concern for "the things of mortals" which has crowned with radiance the lyrics of the Hellenes and given to their drama its immortal poignancy. *Light* and *power*: and the light is the light of a wholly human love for things human; and the power is the power of a clear-seeing and clear-choosing denial of what is below and what is above mortal need.

To bring the characterization to focus, I cannot do better than quote two passages that seem somehow wonderfully to illustrate this complex mode. And the first is to be the beautiful phrase in the *Ion* of Euripides where Creusa even in her agonized outcry against divine injustice finds need to recognize the bright sun-glorify of the world:

ἡλθές μοι χρυσῷ χαίταν
μαρμαίρων, εὐτ' εἰς κόλπους
κρόκκα πέταλα φάρεσιν ἔδρεπον
ἀνθίζειν χρυσαυτανγῆ.

Thou camest to me, thy hair ablaze with gold, while I plucked into my bosom yellow flowers, to bloom on my robes like golden mirrors. . . .

And the second is to be the Aeschylean fragment from the *Niobe*:

μόνος θεῶν γὰρ θάνατος οὐ δώρων ἐρᾶ,
οὐδ' ἄν τι θύων οὐδ' ἐπισπένδων ἀνοῖς,
οὐδ' ἔστι βωμὸς οὐδὲ παιωνίζετ'αι.
μόνου δὲ Πειθῶ δαιμόνων ἀποστατεῖ,—

which Murray has translated:

Lo, one god craves no gift. Thou shalt not bend him
By much drink-offering and burnt sacrifice.
He hath no altar, hearkeneth to no song,
And fair Persuasion standeth far from Death.

In the phrase from Euripides is poetic light, in this from Aeschylus is poetic power. Neither quality is without parallel—constant parallels—in other literatures. I have already given, as

indeed Arnold had given, instances of the luminous mode from other than classical sources. And nigh the verses of Aeschylus I think we may not unworthily set this Red Indian song on the like theme:

There is no evading death;
The old men have not told that any has found a way to pass beyond it;
The career of a Leader is difficult of accomplishment.

Here, as there, is terse and simple directness; here, as there, is force through force repressed. But in the Greek instances there is something more than the naked qualities, a something gained through *composition*—psychical composition. It is the wonderful balance of emotion and sense, both true at the highest pitch, which we see in Creusa; it is the temper of enduring wisdom which we feel through the hurt in Aeschylus.

It is, of course, trite saying that we owe literary *form* to the classic mode. Yet I think it may be worth the saying this once again if we may understand by form this subtle balance—vivid mood and temperate control of all the senses with which nature has endowed us. Expression so moulded will be bright with the illumination of reason and of sense and strong with the power of inner mastership.

IV. THE SAXON AND CELTIC MODES

Zeus, Father of Gods and Men, in whose presidency over the games at Olympia as in his supremacy in the divine council at Olympus is made visible the spirit of Pan-Hellenism,—Zeus, the clear and glowing Heaven, is undisputed lord of the sunny South. His namesake of the North, Norse Tyr and Saxon Tiw, sinks to a wholly secondary place in the pantheon. Other gods of the upper elements rise above him, gods no longer derived from the tranquil-shining aether, but embodiments of storm and turmoil. Mid the dim and dank German forests, it is Woden of the wind and rain, haunted by croaking raven and snarling wolf, Woden, the bellowing leader of the Wild Hunt of souls athwart the nightly sky. In Scandinavia, where the shadows are deep and chill and Nature colors with cold purples and bloody crimsons in

place of the azure and rose of the South, Thor, the Thunderer, hammers out the ways of men, wielding to their terror that thunderbolt which seems but as a kingly scepter in the hands of the Southron Zeus.

Mythologies show only too well how Nature rules men's moods; and we ought never to forget that the persistency of mood is the very essence and definition of personality. The Teutonic gods only reflect the Teutonic temper, which in turn is but the impress of the North upon the souls of men.

It is generally conceded that this Teutonic temper gives the backbone to English literature. The Celtic, with finer instinct for form and more sensitive imagination, gives the delicate hues of rosy flesh, but bone and muscle are Teuton. This is most natural. From the beginning the Anglo-Saxon mind has been heavy and tenebrous. In primitive times it was moved only by hard knocks: the massy alliteration, the aggressive impact, of its epic verse was necessary to arouse it from somnolence. Anglo-Saxon poetry moves by pounding: it echoes the thwack of cudgels, the clang of swords, the braying screech of spear against shield.

*Ne wæs ecg bona,
ac him hilde-grāp heortan wylmas,
bân-hūs gebræc.*

No blade was slayer; the bare battle-grip
Sundered the bone-house, freed the heart's billows.

This is the language of the *Beowulf*—a language of iron strength and nerve. Something of its spirit may be gleaned from metaphors such as *bân-hūs* (bone-house) and its parallel "bone-vat" applied to the human body; and again in "whale-road" and "wave-fortress" as names for the sea, we get something of the intensity and fearlessness of Anglo-Saxon imagination.

The language abounds in similar expressions—*kennings*, as they are called, conventions of poetic insight. Instead of a death-bed there was a "slaughter-bed"—it was a day when men died in their boots, dreading naught more than the stay-at-home "straw-death." The sea was the "terrifying sea," abode of drakes and nixes, but none the less a "path," a "road," a "way."

for the compassless, restless rover from the North. Spaciousness was "sea-gaping"; thoughts were "mind-fettered"; the skull was a "bone-helm" and had need of being serviceable. It was the language of men of a temper not to be toyed with, a temper of Gothic gloom, contemptuously defiant of death. Browning, of our modern poets, perhaps best catches the masterfulness of the old imagery: Shelley "Sun-Treader"; "Spring's arrowy summons"; the "year's snow bound about for a breast-plate";—instances out of a multitude.

In all Anglo-Saxon poetry three themes seem most native and natural, three features most characteristic. There is the *sea* and *fate*, there is *battle* and *energy*, there is *religion* and the *grim seriousness* of life.

No illustration better typifies the first of these than the story of Scyld. A babe and alone, he sailed from an unknown port to be borne at the will of the waves to the people who were to make him theirs. Among them he grew up to kingship and ruled long in glory of prowess and wisdom. When at last he came to die the thanes he had gathered about him, in "mourning mood," laid his gold-adorned body, in the midst of kingly gear, beneath his kingly banner, nigh the mast of his viking ship, "ice-bright and out-eager," and freeing the ship from her mooring, yielded him up once again to the will of wind and wave. It was reverential propitiation wrought by the spell of the sea, by that awed sense of the sea's fatefulness and dooming which Pierre Loti brings home to us in his *Pêcheur d'Islande*. Of all natural majesties none seems greater than the ocean's Titanism; the human heart is abashed before it and it beats upon the imagination with pitiless insistence. The restless regularity of wave and tide, the mighty heavings up and strong subsidences of waters, infinitely various yet infinitely monotonous,—these overwhelm with a sense of on-riding destinies. So in the gray North, beside the boundless haunt of fog-veiled death, the waves hewed the human mind to its conception of Fate, *Wyrd*, giving it something of the hardness of granite brunting the sea, together with granite abundance of destined ends. From this hardening influence of the ocean comes the distinction of the sea-faring Teutons from

the in-dwellers: the homely tenderness so winsome in the German, more and more giving place to the "mind-fettered" mood of a race made dumb with its striving.

For Gothic fatalism was never passive; it was always the Northern way to greet fated doom full-panoplied, warring to the last,—in the mood which Henley's *Invictus* has modernized for us. And so it is that the second great characteristic of our forefathers' poetry—battle and energy—springs from their passion for putting forth strong effort. They seem to have fought more for the berserk joy of it than for plunder-pleasure or glory,—at least their poetry reads so. I have already quoted one grim passage, the weaponless rending of a foe, here no monstrous Grendel, but a man. It is unnecessary to multiply examples, yet I might call to mind that vivid figure in the Finnsburg fragment: "the sword-flame *stood* such as all Finnsberg were afire." It may be pedantic to italicize "stood"; but it seems to me that this metaphor holds the very soul of the race's force: the simile gives the heat of the fight vividly enough, but it must needs be made superlative in metaphor—for it is only the intensest of flames that *stand*.

But there is yet a third characteristic, religion and the serious mood of men who see life, as Milton saw it, in its cosmic setting. Bede tells us how, when the men of Northumbria gathered to debate the adoption of the Christian faith in place of their ancestral paganism, an old earl gave rede in a speech which wonderfully preserves for us the higher mood. I quote Green's rendering: "So seems the life of man, O king, as a sparrow's flight through the hall when you are sitting at meat in winter-tide, with the warm fire lighted on the hearth, but the icy rain-storm without. The sparrow flies in at one door and tarries for a moment in the light and heat of the hearth-fire, and then flying forth from the other vanishes into the wintry darkness whence it came. So tarries for a moment the life of man in our sight, but what is before it, what after it, we know not. If this new teaching tells aught certainly of these, let us follow it." And it was only after the adoption of Christianity that the Anglo-Saxon imagination attained its full dominion. Then it was that Caedmon sang his

lay of the First Shaping, finding for the first time cosmical metaphor comparable to the old Hebrew and in his *Genesis* already prophesying Milton; while Cynewulf, uttering the passionate yearning of the sea-saddened Teuton, struck the master-motiv of the long symphony of English poetry.

I have cited Browning for the Saxon, but he knows other modes as well:

The gray sea and the long black land;
And the yellow half moon large and low;
And the startled little waves that leap
In fiery ringlets from their sleep. . . .

Here is a spirit altogether new. "Natural magic," Arnold calls it, and he tells us that it is the characteristic mode of Celtic poetry. It belongs to an atmosphere of wizardries and night-breaths, of glimmering wonders and mysteries of dreams. The Celt sees Nature animate: the sea teems with sprites, playful or malicious, the forest is denized with pixie and fay, every inch of ground is outlandishly agog with goblin and gnome. The reason is doubtless to be sought in the high-wrought Celtic sensitiveness to impressions, especially to those of a will-o'-the-wisp sort.

Arnold characterizes: "An organization quick to feel impressions, and feeling them very strongly; a lively personality therefore keenly sensitive to joy and sorrow; this is the main point. If the downs of life too much outnumber the ups, this temperament, just because it is so quickly and nearly conscious of all impressions, may no doubt be seen shy and wounded; it may be seen in wistful regret, it may be seen in passionate penetrating melancholy; but its essence is to aspire ardently after life, light, and emotion, to be expansive, adventurous, gay."

Taliessin in a *Song to the Great World* celebrates this aspiration after light, this joy in mere wealth of sensation:

I will adore my Father,
My God, my strengthener,
Who infused through my head
A soul to direct me;
Who has made for me in perception
My seven faculties:

Of fire and earth,
 And water and air,
 And mist and flowers,
 And southerly wind.³

There is no mistaking the natural pantheism. The poet is in earnest when he speaks of fire, earth, water and air, of mist, flowers and wind as faculties of perception. He does not distinguish his life from the life of the objective world of qualities (*not* elements, be it noted). Elsewhere Taliessin sings:

I was with my Lord in the highest sphere,
 On the fall of Lucifer into the depths of hell;
 I have borne a banner before Alexander;
 I know the names of the stars from the north to the south;
 I have been on the galaxy at the throne of the Distributor;
 I was in Canaan when Absalom was slain;
 I conveyed the divine spirit to the level of the vale of Hebron;
 I was in the court of Don before the birth of Gwdion.
 I was instructor to Eli and Enoc;
 I have been winged by the genius of the splendid crosier;
 I have been loquacious prior to being gifted with speech;
 I was at the place of the crucifixion of the merciful son of God;
 I have been three periods in the prison of Arianrod;
 I have been the chief director of the work of the tower of Nimrod;
 I am a wonder whose origin is not known.

An odd infusion, this, of half-won Christianity into the shape-shifting Druidic pantheism; we are led to surmise a monkish revision of an earlier and more purely pagan Taliessin. Indeed, such an one we find,—as pure Druid as is the heathen Amergin of the Irish,—who proclaims:

I am the wind that blows upon the sea, I am the ocean wave, I am the murmur of the surges;

³ From Skene's *Four Ancient Books of Wales*. The citations of Celtic poetry in this essay are chiefly from Skene's work, from the *Mabinogion*, from the collections of Dr. Smith, and in one or two indicated instances from Macpherson's *Ossian*. It is no part of the argument to discuss the age or authenticity of any of these poems; it is enough that they are of unquestioned Celtic authorship and spirit. Whatever the inspiration of the Eighteenth Century Celtic Revival, its expression is as characteristic as the work of Yeats and Sharp in the Nineteenth Century.

I am seven battalions, a strong bull, an eagle on a rock, a ray of the sun;
 I am the most beautiful of herbs, a courageous wild boar, a salmon in the water, a lake upon the plain;
 I am a cunning artist, a gigantic, sword-wielding champion,—
 I can shift my shape like a god.

In other literatures we find parallels to this mood. Empedocles teaches that "with earth we perceive earth, with water the water, with air the air divine, and with fire devouring fire, while love is perceived by means of love, and hate by dismal hate." He tells us, too: "I have been youth and maid and bush and bird and a shining fish in the sea." But Empedocles is a prophet of novel and strange ideas, rather than the voice of a popular conviction. His pantheism is Eastern rather than Western, and is more akin to the Transcendental Ego figured in Emerson's reading of *The Sphinx* than to the phantasmagorical Naturism of the Celt.

A nearer parallel lies in the democratic ubiquity of Walt Whitman's expansive Self; for self-expansion, magnisonant in expression rather than pompous in mood, is the very breath of life to the Celtic soul. Nature and man are all one broidery, interminably interwoven. This is the secret of Celtic natural magic; it springs from the Celt's responsive susceptibility to all the changing glamors of sky and sea, to all the eerie wisdom of the wood, to all the impulsive joys and fears of the world of wilds. It gives him, too, an illocative errantry of mood which naturally seeks in lyric metaphor its fitting expression. Here is a Highland lover's lament for lover:

Like two plants smiling in the dew,
 By the side of the rocks in the warmth of the sun,
 With undivided root,—
 Two plants happy and joyful.
 The maids of Caathan forebore to hurt the plants;
 The light hinds also spared them;
 But the boar gave one of them its death.
 Heavy, heavy, with bending head,
 Is the one weakly plant that still lives on,
 Like a bud withered under the sun.
 O happy were it to be without life!

Where else could have been attained the tender warmth of this allegory save in a mood passionately *en rapport* with Nature and graced with a child's implicit faith in Nature's never-failing responsiveness to the heart's need?

But Nature is not always kind. She may prove most fickle of mistresses, utterly cruel to those who love her. Against this inconstancy, when caress gives place to stormy lashing, the Celtic soul rises in mad revulsion. The trust has been perfect; the hurt is sore; the heart cries out. Read in *The Black Book of Caermarthen* the curse upon Seithenhin whose vice brought the destroying sea upon the plain of Gwydnen; or in *The Red Book of Hergest* the rebellious imprecation of the old bard against the crutch-token of his vanished youth and beauty; or again, that wail over the woes of war—desolations inviting race suicide,—

It is not well that a son should be born:
His youthful destiny
Will perforce be unbelief
And sore privation. . . .

Yet if the Celt was extravagant in sorrow, so was he exultant in stress of battle. He gloried in the red spectacle of war-wrought slaughter:

Mild beams belong not to the storm;
The soul of Gaul is in the roar of battle!

cries one of Ossian's heroes, voicing the spirit of an ever-contending though ever-vanquished race, a race too hot-headed to abstain from quarrel, too valorous to be cautious in the fight.

It is not difficult to draw antitheses between the two folk-souls, the Saxon and the Celtic. The essential difference cannot appear more clearly than in the contrast of the passing of Scyld and the passing of Arthur. There is a striking outward similarity, but the tempers of the two episodes are all at odds. On the one hand we have a bare outline of the event; there is a dumb tugging, a straining hush, with only the over-impending sense of doom to exalt the bald reality. On the other, there is all the atmosphere of magic illusion: the uncanny waste, the wailing mere, the mysterious funeral barque thronged with shadowy

mourners from a magic land,—throughout, the echo of prophecy, Celtic fey-vision.

The antithesis appears again in direct comparison of the formal elements of the two poetries. Saxon poetry is laconic, forceful, pointed, never illogical; Celtic is full of irrelevant by-play and inconsequential succession of ideas,—the eye has seen too much to have perceived any one thing seriously. Both literatures abound in parenthesis and apposition; but in the Saxon these are always significant to the matter in hand, in the Celtic they are mere incidental suggestion. The distinction reappears in dramatic handling. Celtic recitative as Saxon epic was chanted to the harp's accompaniment. But the bard seldom troubles himself to designate a speaker in his tale; himself assumes rôle after rôle, doubtless with dramatic impersonation, leaving his audience to infer from the context the turns from character to character. On the other hand, the gleeman, having to do with less quick-witted hearers, takes no chances; each hero is formally introduced: "Beówulf spake, son of Ecgtheów,"—such is the formula. Possibly here we have a Saxon emphasis of individual right and dignity in contrast with the expansive impersonality of the Celt.

Other qualities are no less in contrast. Compare Saxon and Celtic metaphor. I have already given examples of the former: *hilde-gicel*, "battle-icicle," the fast-chilling pendant of blood clinging to the sword after carnage,—that will recall their quality. How unlike is Ossian's likening of a woman's soul to "an impetuous current foaming white within a rocky strait": or Taliessin's "minstrelsy of perception" and "baptism of consolation" in that *Song to the Great World* already in part quoted! The very title of that song, or of that other *To the Wind*,—do they not distinguish the Celt from the Saxon?

Indeed, we cannot do better than set beside the magniloquent devotion of Taliessin's hymn,

I will adore my Father,
My God, my strengthener. . . .

the humility and simplicity of Caedmon's

Lo, we shall laud Heaven-realm's Lord,
 The Maker's might and His mind's thought,
 The works of the Father! Wonder with wonder,
 He, the Eternal, established a world!
 First for earth's children reared as a roof
 The high dome of Heaven—Holy Creator!
 Made, then, the mid-earth—Warder of Men,
 Lord Everlasting! Thereafter the land,
 A fold for us, fitted—Father Almighty!

In the one hymn the soul of the man leaps out into Nature, identifies itself with creation and the creative spirit; in the other, the whole bent is to circumscribe and restrict man's sphere, recognizing that his ways are limited and charted by the Power above. To the heathen soul of Beówulf this power was *Wyrd*, fate, to the gentler-minded Caedmon the God of the new religion; yet to them both it was external to man, man-ruling. It is only the Celts, a recent investigator tells us, who believed and taught in myth that men had warred with and conquered gods,—perhaps the crude and primitive expression of their indomitable conviction that the divinity in man and Nature, at the last, are one, that the human vision of beauty in the world is vision of Nature's final truth.

Nature awed the Saxon chiefly by her manifestation of strength,—the *terrifying sea!* He felt the inevitability of the dooms of the Norns, and thence arose his Hamlet-like sense of human tragedy and of the final paltriness of the mere human soul. Hamlet, indeed, is the typical Shakespearian embodiment of the Teutonic spirit, just as Macbeth and Lear are Shakespeare's typical Celts. A similar contrast holds between Goethe's Faust and Marlowe's Faustus. On the one side is tragedy of the idea pitilessly wrought out under inexorable fates; on the other is tumultuous rebellion against the fortune that proved unconquerable. *Fate* and *Fortune!* the Teuton beholding in Nature a mistress whose will he cannot overcome but whose doomings he can endure with uncrushed lordliness of soul; the Celt perceiving in her a Fortuna to be won by ardent wooings, to be lost with cataclysmical despair.

In our modern literature we get from the Celt our love of wild nature, not perchance of meadow-green and the springtide glee of birds, but of nature in wider sweep, tameless impulse. The Celtic imagination never hesitates, its sympathy is limitlessly expansive. I know of no finer-poised image than in Ossian's (Macpherson's Ossian) address to the sun, "thou tremblest at the gates of the West",—seizing and vivifying that instant of luminous hesitancy when the sun quivers upon the verge of the western wave, as if timorously reluctant, ere it plunges beneath the dark waters. And what loftier in prophetic sadness than in that same poem,—

Thou art perchance, like me, born for a season;
Thy years will have an end;
Thou shalt sleep in thy clouds, careless of the voice of the morning.

Again, the passion for beauty is surely Celtic—for beauty unspoiled by morals and moralizing. Keats is unmistakably foretold in the Cymric bard's

The beautiful I sang of, I will sing!

And as unmistakably Keats echoes again the airiness and fairness, the magic and music and mystery of bardic poetry. In

. . . . magic casements, opening on the foam
Of perilous seas, in faery lands forlorn. . . .

Arnold finds the authentic note of Celticism. But it is not in Keats alone. Perhaps no verses of his great romantic contemporaries are oftener quoted than Coleridge's

. . . . woman wailing for her demon lover . . .

and Wordsworth's

. . . . old unhappy far-off things,
And battles long ago.

And in these, too, the Celticism is surely unmistakable and authentic.

Beauty and sympathy: the detail, the tenderness and vividness, the richness and radiance of our nature poetry, come from the

Celt. But the idea is Saxon; and Saxon is that strength, at its greatest Titanic, which gains its compulsoriness from ideational empery; and Saxon is the dignity which belongs to those who have found themselves, and finding have conquered; Saxon, too, are the will, the equipoise, the motive, the power,—all the Shakespearian majesties.

V. FUSION IN THE BALLAD

For knowledge is a qualification much in vogue in philosophical discussions, and it expresses a distinction really invaluable for any critical analysis. The phrase discriminates what we may call the manners of realities from the realities themselves; it indicates that natural selection of the significant and utile which is an instinct of our attention, and it emphasizes the notion that our perceptions of disjunct phenomena are exaggerations of what differences really exist.

If we are to live and grow it is essential that we perceive some things very clearly; accessory detail may be elided and must be elided in order that we may profitably attend to the main point. Hence all our truth is partial and biased, and the striking distinctions we draw for the sake of emphasis are almost invariably what the philosophers term distinctions for knowledge alone. The reality about which our truth is true is far more complex than we make it appear for it is composed of an intermingling of elements too intricate for knowledge to grasp. Truth itself is merely the picturesque aspect of things,—always, therefore, a somewhat superficial aspect.

The contrast which I have drawn between Saxon and Celt is truth of this picturesque sort. The contrast is exaggerated because of the isolating of the traits compared. When these traits are set into the general context of human nature, as they are set in the real men, they appear far less antithetical and antagonistic: the differences become obliterated in the envelope of a mutual clay. Shared by all mankind and coloring communally men's reasonings and humors are certain fundamental loves—attractive, jealous, or perverse,—hates and their attendant fears, hopes with eager aspirations quick at their heels. These form

the major composition of human character and the basis of intercourse and understanding. But just because the major character—human nature—is universal, it cannot furnish a text for discriminations; the marking of differences must be on a scale of minor moods.

Similar qualification applies to literatures and critical separations of them. Just as Arnold's 'luminous mode' is the elemental mode of all poetry and a *sine qua non* of any poetic development, so the elemental impulses of the poet are those which first find expression in his work. They are the primordial impulses of human nature; their appeal is universal and they always appear in the theme and treatment of what the critics call world-literature. Shakespeare is neither Saxon nor Celt nor mere Englishman: he is a laureate of mankind.

But *exceptis excipiendis*, as the scholastics have it,—let us except the things that are to be excepted and take for granted what ought to be assumed. The prefaces are palpable. What point remains?

Well, there remains the picturesque truth. Despite the conformity of their cephalic indices, the substantively staid Englishman is not apt to be mistaken for the roisterous son of Erin. And in primitive literatures it is difficult anywhere to find a sharper or more consistently maintained contrast of neighbors than exists between the first poetries of Saxon and Celt. There is never any danger of confusing their characteristics: energy and fire, steadfastness under fate,—these are Saxon; and as invariably buoyancy in joy, tumult in despair, belong to Cymry and Gael.

But all this is for literature in embryo,—before the English had come to its own. There was to be an era of fusion; thereafter, a people. And amid this people any poet might challenge his lineage in vain to show sole paternity for one race or the other; never could he thread warp of Saxon from woof of Celt, nor in his fabricked character say what shimmer came from this thread, what from that. Time is in truth alchemical: no material is invulnerable to its transmutations; granted sped years, new creation is certain. So time created the poet-soul

of Albion. Hereafter we cannot speak of a Celtic poetry and a Saxon poetry, but only of an English poetry. Yet in this English poetry we may continue to discriminate a Celtic from a Saxon *mode*, for in our study of origins we have come clearly to understand what each of these modes denotes. Just as all poetic insight instinctively finds first expression in the luminous mode, so the peculiar insights arising from the commingled ethnic strains seek expression in the modes anciently native to each. But because the blood, long-fused, has become one, any discrimination of mode must henceforth be understood as made only for criticism and significant only *for knowledge*; there is not meant to be any scalpular analysis of the organization either of poet or poetry.

The truest expression of the folk-soul of any race, especially since the development of culture-tradition and the accustomed contacts of civilizations, is to be found in its people's poetry—in the songs and ballads of the tavern and the farm-stead. So with the English. Throughout the Dark Ages fusion was slowly wrought, begun, as was natural, and first completed in the lower strata of society. Literature during the period betook itself perforce to the shelter of the monastery; later, with the advent of the Norman, to the patronage of the Court. But monkish *belles-lettres*, after the Saxon era, comprised little beyond Latin hymns, not over-delicate, or, in English, such dreary monodies as the *Ormulum* of Orm; and the poetry of the Court under the early Plantagenets was exotic importation from the land of the *trouvère*. Not until the Thirteenth Century pre-Renaissance renaissance was there produced a real English poetry. The early revival culminates in Chaucer. Thereafter a lapse during the Wars of the Roses, and then the sudden glories of the great era. But the literature composed under Elizabeth was more than a folk-literature. Classic culture, Italian and Greek, entered in to complicate its character. The blood of the race shows not less red and vigorous; we perceive the native element not less surely; but for wholly untaught manifestation, we must look elsewhere.

During all these periods, nighest the heart of the people, was

a literature of minstrel balladry. It antedated and persisted through the major development. In it we see crystal-clear the various facets of English character,—the turn that leads to Puritanism, the metaphorical idealism, grim repression alternating with fancy free. As with the old epic and recitative, harp accompaniment was long essential; but at the same time the words were beaten into finer rhythms and rimes and metres—a music of their own. Again, the moral of the tale, the ethos of the literature, maintained itself; but together with much poignancy of mood. In the English ballad, in short, we have a form half way between ethnic chant and the lyric flower of civilization.

I am aware that there is some present-day cavil against the autochthonous character and origin of our balladry, companioned with depreciation of its literary quality. *Réchauffé* is the term applied, the ballad being viewed as consequence and expression of an enervated Medievalism, the ballad-maker being reckoned akin to the modern decadent.⁴ I conceive that the broad comparative studies and keenly critical analysis of such men as Francis Gummere have finally 'laid' this spectre. "The minstrel of more romantic associations had nothing to do with the making of those typical ballads of tradition which form the bulk and give the quality in any collection of note," he tells us. While it is not for me to judge the contention, the interpretation of balladry lying in my interest applies whether it be conceived as the product of a dying guild of Medieval poets or—what the evidence favors—the untaught expression of the common folk preserved in "household and communal memory."

What is crucial is to know that the ballad was really popular and did lay vigorous hold upon the imagination of the race. This we are sure of at least from the day when Langland's parson mastered "rymes of Robin Hood" in place of ritual; and for the rest, I conceive that one reference, 'transcribed from the singing of a milkmaid' or 'taken from the lips of a very old countryman,' is worth some volumes of critical exposition,—certainly it precludes a doctrine of cult in ballad appreciation. Fur-

⁴G. Gregory Smith, *The Transition Period*, Ch. VI.

ther the conspicuous character of the ballad is as *chanson de geste*, and we know that the singing of exploits is as old as valorous conceit. In Caedmon's day we get a glimpse of convivial tale-telling; and if we are to credit the claimed antiquity of the Welsh poems, we have obvious British ballads in the Sixth Century.

The universality of the song habit in the two main races of old Britain should explain the ingrained persistence of it; yet to clear some lurking doubt, I would cite late survivals of the old lore. In America, at least, they are not wanting. I have seen, amid yellowed papers of the late Eighteenth Century preserved in a population whose literary asset was fairly circumscribed by the Bible, the Farmer's Almanack and the New England Primer, a carefully transcribed ballad in theme and form typical of the old school,—a tale of parent-combatted love, of sea-faring, of murder, of ghost and retribution. And I have seen ballad-making still in progress in Nebraskan countryside, as doubtless it persists, despite the ubiquity of print, in remoter frontiers. For a showing of quality I borrow from a friend's recollection (surely an approved source!) a fragment of Western song, the context unfortunately lost, which for tersely grim humor might belong to the hey-day of balladry.

A red man lived down in Tennessee,—
 Mighty big Injun sure,—
 He growed as tall as the tallest tree,
 And he says, says he,
 "Big Injun me,
 Mighty big Injun sure."

White men blazed out a road, you see;—
 Mighty big Injun sure,—
 He combed their hair with a knife; says he,
 "It's combed for good—
 Big Injun me,
 Mighty big Injun sure!"

And this eloquent bit of metaphor introduces the question of poetic values, where the veriest layman has right to opinion.

One may safely appeal to the *consensus gentium*,—not of boors and milkmaids, but of poets. Sidney's clarion phrase rings impulsively to mind: "I never heard the old song of Percy and Douglas that I found not my heart moved more than with a trumpet." That alone were sufficient were we not over-rich in corroboration. Perhaps one may best name the poets of our later era who have found model and inspiration in the popular balladry: Scott, Burns, Keats, the Rosettis, Swinburne, Kipling . . . but the whole gamut must be run to name them all; for no influence has better seasoned modern English poetry than this of the native song of the people.

No words are better on this theme than the sane appraisal given by Professor Gummere at the close of *The Popular Ballad*: The majority of our ballads, he says, "must be classed as inferior poems. The best, even, cannot compete with great poems of art; but there is a greatness of their own in their attitude towards life, in their summary and transcript of it. They know, as the lords of tragedy in Hellas knew, as Shakespeare knew, that only the anguish of some inevitable conflict is worth while. They know by instinct, as lyric poets have known in their 'recollected emotion,' that while tragedy is insoluble, it holds the solution of existence in its own mystery, and that only from death springs the meaning of life."

"*They know by instinct*," and with instinctive surety press home, that poignancy of life which is the soul of poetry.

But my present interest is to show in the ballad literature the first clear fusion of the Saxon and Celtic modes; and this asks the reader's assent only to the genuineness of the ballad inspiration, as voicing the character and ideals of the normal Englishman of the mid-period. Which conceded, it is due time for illustration. I will not quote *in extenso* nor cite more than typical instances; the reader may call to mind further substantiation.

Let us begin with the untouched Saxon mode,—and there are many ballads similar in construction and theme to this Scottish ballad of *Edward*, which Brahms has so magnificently interpreted in the sister art:

"His hawks they flie so eagerly,
There's no fowl dare him come nigh."

Down there comes a fallow doe,
As great with young as she might go.

She lift up his bloody head,
And kist his wounds that were so red.

She got him up upon her back,
And carried him to earthen lake.

She buried him before the prime,
She was dead herself ere even-song time.

I have quoted these two ballads as representing extremes, but even so we see evidences of that fusion clearly marked in the mass of the ballad literature. In the dramatic form of presentation, in the repetition and refrain, we see the Celtic spirit; and even the dominant Saxon note, of terse irony or brawny green-sward vigor, is continuously surprised into delicacies of diction and a buoyant tenderness for nature surely Celtic; it is as if the poet's robust purpose were startled into beauty by roguishly winsome sprites of fancy only half acclimated to his mood and still eyed a little askance. The character appears, in its perfect fusion, as well as in any ballad I recall, in the almost pert tragedy of the song called from its refrain, *Fine Flowers in the Valley*:

She sat down below a thorn,
Fine flowers in the Valley;
And there she has her sweet babe born,
And the green leaves they grow rarely.

"Smile na sae sweet, my bonnie babe,
And ye smile sae sweet, ye'll smile me dead."

She 's ta'en out her little penknife,
And twinn'd the babe o' its sweet life.

She 's howket a grave by the light o' the moon,
And there she 's buried her sweet babe in.

As she was going to the church
She saw a sweet babe in the porch.

“O sweet babe, and thou wert mine,
I wad clead thee in the silk so fine.”

“O mother dear, when I was thine,
Ye did na prove to me sae kind.”

And in this ballad the irrelevant refrain throwing an echo of nature into the human tragedy and the sweetness of “ye’ll smile me dead” are Celtic; the *dénouement* and the keen irony are Saxon. The best qualities of each of the primitive poetries are present: delicacy together with significant repression, nature-sympathy with moral sternness, a diction of expressive melody, yet austere direct;—and all a foretelling of the perfected lyric.

VI. THE TURN INTO METAPHOR

All forms of poetry interact upon one another and by subtle gradation pass into one another, so that the development of each is accompanied by coordinate modification of the others, some one form, best adapted to the poetic insight of an era, dominating and molding what others persist along with it.

Customarily we conceive the Elizabethan period as the period of paramount drama; but it may fairly be questioned if the real sovereignty belonged not to lyric passion. Certainly the drama of that age is glorified with song as is no other modern drama, while the more intimate poets’ poetry—bloom of garden solitudes—shows less tendency to bow to dramatic mastery than even Victorian lyricism. Likely the music-fire of old England—not yet snuffed out by Puritanism—had much to do with preserving unalloyed the joyous melody of Elizabethan song; but I think, if the conceit be not too fanciful, that in that lyric sweetness we hearken rather the swan-song of a dying music-poetry. The full flush of the great era brought English genius to the parting of the ways: thereafter must be chosen wholly musical or wholly poetical embodiment,—the word must divorce the singing for the sake of more sublimate harmonies, the note must wing free from the word for the fluting of airier melodies. The poetic fruition was chosen, and the seal of the choice is found in accentuation of

the metaphoric element of lyric mood, sensuous quality yielding to the need of finer psychological discrimination, personality becoming the poetic touchstone.

Song, I suppose, is the most primitive aesthetic expression of mankind, arising as emotional comprehension of emphatic impressions and issuing into life as a melody of singing words. The ballad, as a poem of action—"narrative is its vital fact" and "its supreme art is to tell its story well," Professor Gummere states—had at least one source in battle-boastings and laudations of prowess. At first the hero praised himself, narrating his deeds in the formal and lofty style implied by the old verb *mathelian*,—a flavor of the bombastic egotism of Mesopotamian monarchs inscribing their kingly conquests. Later appeared the professional minstrel in the chieftain's retinue, and with him the artistically finished narrative that ensured perpetuity of fame. Doubtless the ballad-form and its music setting—as distinguished from epic narrative—may have been created by antiphonies of dancers; but it is safe to conjecture the coordinate probability that war-challenge and death-chant constitute the primeval *chanson de geste* in the same wise that *mathelian* foretells poetic diction.

The main point is the loose annexation of music to ballad narrative,—the logical consequence of the narrative function. In musical art there are two fundamental modes of setting a song: the ballad form, in which the musical motif is repeated stanza by stanza to the song's limit; and the lyric aria, in which the initial element *a* is repeated after an intervening element *b*, so that the whole form may be expressed *a:b:a*. In the ballad form the effect is derived from the verbal content of the song, which in ballad narrative moves to a dramatic climax; or musically from the contrast of word change with repeated melody, or yet from the mere emphasis which lies in repetition. In the lyric aria the composition is a unit, and the total effect depends upon a feeling for the whole form and a gathering up and inclusion of the entire movement in the final appreciation,—the repeated element seeming to absorb all that has gone before, and returning

to the hearer with a subtler force and finality. On this distinction the ballad is relatively independent of the music, the non-dramatic song relatively subordinate to it.

Historically both have attained complete independence. The ballad by the use of refrain attains that effect of unity—emphasis in iteration—which is else supplied by the music; while the finer types of pure lyricism reduplicate, verbally or ideationally, the characteristic scheme of the lyric aria: there is a return in the last phrase to the chord struck in the first, with the added force of the intervening motive gathered into it, what was at first merely objective being made subjective and personal. This latter type of movement, in which external nature is poetically conquered and humanized, Ferris Greenslet designates "the lyric return," characterizing it as "the essential lyrical unity in which the poet objectifies his mood in the beautiful object, or by a kind of mystic egoism lays hold of nature to make her express himself."

Such unity, with its poetic mastering of Nature, is impressively achieved in Leopardi's *l'Infinito* (I quote Sir Theodore Martin's translation):

This lonely knoll was ever dear to me,
 This hedgrow, too, that hides from view so large
 A portion of the fair horizon's verge.
 But, as I sit and gaze, thoughts rise in me
 Of spaces limitless that lie beyond,
 Of superhuman silences, and depths
 Of quietude profound; so by degrees
 Awe troubles not my heart. And as I hear
 The wind that rustles through the brake hard by,
 That fitful sound with these vast silences
 I set me to compare, and so recall
 Eternity, and the roll of ages dead,
 And the live present, with its mad turmoil.
 Thus thought is founder'd in immensity,
 And shipwreck in that ocean's sweet to me.

The shuttering confines of the narrow retreat serve only to arouse the poet's imagination, till, ignoring the limitations of sense, he passes ultimate horizons and takes compass of the still

infinities; and at last, soothed through very awe, he measures the conqueror of time, the world's unrest and its quieting. Not less inclusive than the cosmos would be his soul; not more futile is the wrecked ship at sea than human life; the one attainment is the peace of surrender. A more native example is Shelley's *Ode to the West Wind*,—element after element of the wind's wild imagery is gathered to a cumulative node of energy till by the final strophe this energy becomes all the poet's own:

Make me thy lyre, even as the forest is:
 What if my leaves are falling like its own!
 The tumult of thy mighty harmonies
 Will take from both a deep autumnal tone,
 Sweet tho' in sadness. Be thou, spirit fierce,
 My spirit! Be thou me, impetuous one!

The movement, be it noted, is ideational and emotional, not necessarily sensuous as in the lyric aria; but the principle and effect is the same—to give ideal unity and finish to the expression. Perhaps the fullest recognition of the psychosis here exemplified is in sonnet structure, the octet portraying nature, the sestet flooding with the spiritual illumination which is the poem's inspiration; but it is present also wherever the lyric, in contrast to mere song glee, becomes reflective or impressionistic.⁵ In such poetry want of it is an imperfection likely to be keenly felt. For instance, Shelley's *Isle*:

There was a little lawny islet
 By anemone and violet,
 Like mosaic paven:
 And its roof was flowers and leaves
 Which the summer's breath enweaves
 Where nor sun nor showers nor breeze
 Pierce the pines and tallest trees,
 Each a gem engraven.

⁵ A perfect illustration of the ideational form, stripped of verbal refrain, is Walt Whitman's:

As I watch'd the ploughman ploughing,
 Or the sower sowing in the fields—or the harvester harvesting,
 I saw there too, O life and death, your analogies:
 (Life, life is the tillage, and Death is the harvest according.)

Girt by many an azure wave
With which clouds and mountains pave
A lake's blue chasm.

Spite of melody of phrase having a certain completeness, spite of vivid beauty, one cannot overcome a feeling of the poem's fragmentariness; the melody seems merely stanzaic, and appreciation is bewildered; there is instinctively demanded a striking in of poetic sunlight. The best lyrics always leave a mood of yearning and beauty-desire; but here we have only a need of fuller expression, and hence an artistic insufficiency.

In pure song the musical need is omnipresent, so that the simple outburst of mood is last of poems to break free from the musician's art; but at its best song develops an intrinsic music which satisfies this need,—as imperatively as, for example, does Swinburne's

If love were what the rose is,
And I were like the leaf . . .

The music may be verbal imitation of the lyric aria, with a terminating recurrence of the initial phrase or of its verbal quality,—and by far the most perfect example is Tennyson's threnodic "Break, break, break," throbbing the ocean's perpetuity,—or there may be instead a free outward flow and abandonment to limpid utterance. The first is literally reflective, adapted therefore to self-conscious expression as in the instances above. Free song, on the other hand, is never self-conscious, and its movement is always natural and unpremeditated, limited only by the singer's breath. It comes as the "careless rapture" of the Elizabethan mood,—all a joyous bubbling over of the singing soul. Usually such song is handily set to music, but it may be tune to itself. When so, it leaves always a suggestion of echo which gives it artistic finality. Take one of Ariel's songs, any one of them:

Full fathom five thy father lies:
Of his bones are coral made;
Those are pearls that were his eyes:
Nothing of him that doth fade,

But doth suffer a sea-change
 Into something rich and strange.
 Sea-nymphs hourly ring his knell:
 Hark! I hear them,—
 Ding, dong, bell.

How it echoes and dies away and echoes again, with distant fainting fairy note—away into the dim sea's depths, like a last quiver of violins after the wood-wind notes are gone! This is song suspense,—melodies suspuriantly repeating, like distant-sounding surfs, a world of song and wraith where soft pipes play

Not to the sensual ear, but, more endear'd,
 Pipe to the spirit ditties of no tone.

Both in the lyric aria and in this simpler song, the development is cumulative: in each case the structure is close-knit, the order of elements is imperative, and the unity attained complete. The final effect does not depend upon mere memory, but upon the subtler psychical power of apperception—of apprehension of unities and complex wholes. Nor is this an apperception of the logical inter-linkings of ideas; it is apperception of mood and is founded in aesthetic as well as in ideational necessity; while on account of the elusiveness of mood comes the compulsory brevity of the expression which must make it one.

Now in contrast to this cumulative development stands dramatic development. In place of the onward poise of lyric movement, dramatic movement leads to a kind of shock—a turn and reversal of the wrought mood at the climax. In contrast to apperceptual retention of the whole, foregoing elements are driven out in the moment of surprise; there is an overturning of equilibrium and a long oscillation and a final effect only to be fixed by gradual quietings. The development may be of events, as in ballad narrative; it may be of ideas, as in epigram and witty song; it may even be play upon sentiment, as in Swinburne's exotic balladry;—but in each case it scores its effect by some sort of violence, wound and recoil. The method is masterful for driving home a point; hence for wit, satire, and irony. The ballad-makers knew the trick of it well. Take the fateful last

lines of *William and Marjorie*; it would be hard to find more effective irony unless one choose *Edward*, or some other of the old songs; though we might pair it from Kipling's *Ballad of Fisher's Boarding House*,—

But Anne of Austria looted first
The maid Ultruda's charm—
The little silver crucifix
That keeps a man from harm.

For such dramatic development, the music-setting serves but as an enhancing background, its monotony of motif giving the sense of unity and holding together the fleeting elements of the action. If the action be close-knit and inevitable, the accessory undertone is quite dispensable or may be allowed a development of its own subordinately echoing the major movement, on the analogue of a tragedy within a tragedy,—say Euphrania's to Penthea's in Ford's *Broken Heart*. This actually occurs in the artistic balladry of Rossetti, made possible by the substitution of word for musical refrain. And as a matter of fact we find in ballad development a curious disjunction of the music-form from the dramatic form. The one is abstracted under the domination of the singing impulse and made into a kind of song, later to become ballad of metaphor; the other, seized by a purely dramatic genius, is wrought into a new drama of metaphor. With the development from the music-form I am first concerned, and the better to illustrate it in English I would cite its forecasting in a Welsh form of verse.

A favorite stanza of the Welsh bard was the triad, or rimed triplet. Sometimes it was used for narrative, battle-description and the like, sometimes for a kind of gnomic verse. A slightly varying repetition of the first line, stanza by stanza, gave the effect of refrain, and often held together very divergent reflections. A few stanzas may illustrate: I quote from Skene's *Hergest*:

The Calends of winter, the time of pleasant gossiping,
The gale and the storm keep equal pace;
It is the work of the wise to keep a secret.

The Calends of winter, the stags are lean,
 Yellow the tops of the birch, deserted the summer dwelling;
 Woe to him who for a trifle deserves disgrace.

The Calends of winter, it is hard and dry;
 Very black is the raven, quick the arrow from the bow;
 At the stumbling of the old the smile of youth is apt to break out.

The Calends of winter, bare is where the heath is burnt,
 The plough is in the furrow; the ox at work;
 Amongst a hundred there is hardly a friend.

These are but a few stanzas from the many in the poem, none of which are closely interknit; their order seems to be wholly fortuitous. The main characteristics are a sameness of mood from the iterated dreariness of winter; a vividness of vision that notes the enhanced blackness of the raven against the snow; but a very gossamer thread of association joining the suggested ideas. Only a fleet-footed imagination can keep the pace; the whole movement is disconnected and episodic; musical accompaniment must have served in no small degree to create a main effect, and it will be noted that whatever unity the poem seems to possess is a unity of form in simple repetition, like the abstract music-form.

Let us set in contrast that curse upon Seithenhin heretofore alluded to.

Seithenhin, stand thou forth,
 And behold the billowy rows;
 The sea has covered the plain of Gwydnen.

Accursed be the damsel,
 Who, after the wailing,
 Let loose the Fountain of Venus, the raging deep.

Accursed be the maiden,
 Who, after the conflict, let loose
 The Fountain of Venus, the desolating sea.

A great cry from the roaring sea arises above the summit of the
 rampart,
 Today even to God does the supplication come!
 Common after excess there ensues restraint.

A cry from the roaring sea overpowers me this night,
And it is not easy to relieve me;
Common after excess succeeds adversity.

A cry from the roaring sea comes upon the winds;
The mighty and beneficent God has caused it!
Common after excess is want.

A cry from the roaring sea
Impels me from my resting-place this night;
Common after excess is far-extending destruction.

The grave of Seithenhin the weak-minded
Between Caer Cenedir and the shore
Of the great sea and Cinran.

Seithenhin, it will be remembered, was a drunkard through whose negligence a gap was rent in the sea-dyke and a city's population swallowed up. In this poem the bard imaginatively hears the cry of the drowning people ringing up with the roar of the sea, which he magically personifies in the Celtic way, throwing it under control of witchery. But the structure interests most. There are three nearly coordinate developments:—of the event described, of the poet's emotion, of his moralizing reflection. The three are interwoven and carried forward by a double repetend, first verse echoing first and third echoing third, while because of well-knit theme, in place of monotonous reduplication the echoing verses admit progressive development. And the poem, trending toward dramatic development of mood, is made wholly self-sufficient, quite independent of music.

I have cited these Welsh poems as types, with inference as to the origin of similar forms in English poetry. They appear to show a disintegration of the ballad, the music-form of it made dominant in the first instance, and then, in the second, subordinated to a new, subjective dramatic evolution. In Caroline poetry we find parallel instances, showing, it seems to me, the ruling instinct for singing, native to the period. Certainly the following, from Robert Jones' *Fift Booke of Ayres—Onely for the Lute, the Basvyoll and voice*,⁶ has neither dramatic nor song movement:

⁶ B. H. Blackwell, Oxford, 1901.

Love is a prettie frencie,
 A melancholy fire,
 Begot by lookes,
 Maintained with hopes,
 And heythen'd by desire.

Love is a pretie tyrant
 By our affections armed,
 Take them away,
 None lives this day,
 The coward boy hath harmed.

Love is a pretie idole,
 Opinion did devise him,
 His votaries
 Is sloth and lies,
 The robes that do disguise him.

Love is a pretie painter,
 And counterfeiteth passion,
 His shadow'd lies,
 Makes fansies rise,
 To set beliefe in fashion.

Love is a pretie pedler,
 Whose packe is fraught with sorrowes,
 With doubtts, with feares,
 With sighs, with teares,
 Some joyes—but those he borrowes.

Love is a pretie nothing,
 Yet what a quoile it keepes,
 With thousand eyes
 Of jealousies,
 Yet no one ever sleepes.

The singing note is unmistakable enough, but there is no onward echo after the singing is done, as in the true song. It is all a dainty flitting from conceit to conceit, as of a bee fastidious among flower-bells. This is a customary character of not a little of the poetry of the period. An advance toward organic unity, however, is met in Crashaw's *Weeper*, which, though a series of idle toyings with the Magdalen's tears, as if they were in truth the pearls the poet would have them, yet in

certain stanzas reveals a tighter reined fancy and a hint of dramatic interlinking. These come in the first flush of inspiration:

Hail sister springs,
Parents of silver-footed rills!
Ever-bubbling things!
Throwing crystal! Snowy hills!
Still spending, never spent; I mean
Thy fair eyes, sweet Magdalene.

Heavens thy fair eyes be;
Heavens of ever-falling stars;
'Tis seed-time still with thee,
And stars thou sow'st, whose harvest dares
Promise the earth to countershine
Whatever makes Heaven's forehead fine.

But we're deceived all;
Stars indeed they are too true,
For they but seem to fall
As Heaven's other spangles do;
It is not for our earth and us,
To shine in things so precious.

Upwards thou dost weep;
Heaven's bosom drinks the gentle stream.
Where the milky rivers creep,
Thine floats above and is the cream.
Waters above the heavens, what they be,
We are best taught by thy tears and thee.

Every morn from hence
A brisk cherub something sips,
Whose soft influence
Adds sweetness to his sweetest lips;
Then to his music: and his song
Tastes of his breakfast all day long.

These stanzas rise above poetic conceit to poetic allegory, or indeed to pure symbolism. I suspect that any conceit becomes allegory to an imaginative sympathy lively enough to fill in the hiatus and catch the meaning underlying the overbright concreteness. For allegory is always an objectively concrete rendering of

spiritually apprehended truth; its emphasis of the day-light aspect of things is only apparent. When this emphasis is shifted enough to throw mood into the foreground, dimming objective outlines, we have symbolism. But even here the dramatic form, movement as of facts, is largely retained, though adapted to the needs of metaphor. It is the final victory of lyric impulse over the ethical motive of primitive balladry and represents a last adaptation of the ballad form. I have already named Swinburne and Rossetti as exemplars; perhaps I might also cite Swinburne's *King's Daughter* and Rossetti's *Sister Helen*, not as best instances, but because each of those poems possesses a dual development analogous to that in the curse of Seithenhin. And by comparing the clarity of the major theme, at least in Rossetti's poem, with the mysticism of the refrain, that distinction which I draw between allegory and symbolism may show the clearer. It is the interplay of the two which creates the last appreciation, so that there is contrived that drama of mood which contrasts with lyric movements.

But there is yet another drama of mood, made in another fashion. The development which I have drawn first abstracts the music-form from the dramatic context, and then, casting aside all but verbal melody, evolves an esoteric drama of symbolism. But on the other hand, in Browning's dramatic monologues we attain a not dissimilar end by an opposite course. Here it is the event that is seized upon and installed in dramatic independence. But the poem never exists for the event, the story, nor even for the moral of it. Always it exists for the underimpelling mood. Likely the paradox of a great poet with dramatic instincts failing to achieve great drama is partly to be explained by the fact that Browning's interest did focus so intensely in the mood, the spirit of the thing; the sensuous dress is after all but a dress, and he saw too clearly the naked soul always to catch its pall of flesh and blood with the needful dramatic verve. But he did know the soul's action and adapting to its representation the vivacity of the old ballad he gave us a new poetic form and a new drama of the spirit.

Victorian poetry thus reveals the final appropriation of balladry

to poetic need. That need, as always, was for the subtler interpretation of human instinct. Passed from the social to the individual nature of man, from the ethical and objective to the spiritual world, it becomes perforce more and more symbolical. This is what I mean by the turn into metaphor. In song we see it in a slow-winning freedom from thralldom of sense; in balladry in the dominance of spiritual over ethical motive; but best it is revealed in that lyric restlessness and poignancy which is the supreme poetic utterance of the age.

VII. THE LYRIC AND MODERNITY

Reflective poetry has so grown upon us of late generations that there is need of a fuller vocabulary of distinctions than is commonly in use. We distinguish adequately enough those forms of gnomic poetry—didactic, satiric, and epigrammatic verse—which deliver sententious sentiment or quizzical philosophizing; but we have no very good term for that more seriously reflective poetry, sometimes elegiac in tone, sometimes idyllic, sometimes, as Khayyam's *Rubaiyat*, light-lipped and hopeless. Poetry of this class verges toward a logical rather than a lyrical order. It lives largely in a realm of knowing, and the knowing is of a spiritual, semi-mystical, gnostic order. Such poetry aims to interpret truth,—stressing both the interpretation and the truth. The interpretation is not mere expression, it is a rendering in the peculiar color of the poet's personality, from an introspective attitude. And the truth is not the brute fact of scientific interests, but it is the vital, human truth of things. This semi-intellectual element is present in pure lyricism, but it does not tyrannize over mood and movement as in the quasi-lyrical forms. There is something of an antipode between poetic philosophizing and the naïve utterance of mood; and while both may be fused, as in Wordsworth's *On Intimations of Immortality*, there is much good poetry of the *Locksley Hall* sort in which lyrical form and movement are too thoroughly subordinated to the intellectual leadings of the theme to warrant alignment with the same type. But the distinction must not be made insistent. As quaint Dr. Aitkin notes, the

Lyric Muse is versatile, "capable of adapting herself to the sprightly and ludicrous, equally with the tender and pathetic," to the even calm of thought as to the fitful flame of passion.

A kind of mental heaviness is, perhaps, the conspicuous characteristic of modern verse (most of all with the best poets)—a heaviness not due so much to the weight of the ideas as to the doubtfulness of the thought: there is lack of conviction, and with it loss of the old poetic buoyancy. In English poetry this is doubtless intensified because of that quality of reserve which is the conspicuous trait of English character. In our tongue we have no "confessions," no soul's day-book, really worth study; and every publication of a great mind's private expression, in letters and the like, induces critical sniffings, as if the thing were indelicate. Puritanism may have been an effect rather than a cause of such instinctive reserve, but it was an effect enhancing in its after-issue the quality that occasioned it: with passing years we have not become less hermit-like. It is asked why America has produced no world-literature, and I venture that a partial answer is the fact that Puritanism took deepest and strongest root in America and especially in that section first to find literary voice. Poetic power is not to be attained without some sacrifice of self, some immolation of spiritual privacy. A comprehension of the New England character portrayed in contemporary prose will yield fair account for our poetic poverty; American genius is still too awkwardly conscious of the soul's garmenting. I imagine that the excess of Walt Whitman's revolt is measure of the effort necessary to the attainment of freedom. Always the danger with the English mind is imaginative dissipation after the barriers are once broken down. We see it in the coarseness of the Restoration, and, in another bent, in those lapses into sentimentalism which sometimes tainted even the finer minds in the early years of last century's romantic revolt.

Yet if repression sometimes weakens, and sometimes, through excessive reaction, leads to fault, it is still the trait which endows our poetry with finest quality in the more perfect attainment. It gives dignity and control, chastity and sweetness, tact in ex-

pression, and an ineffable grace in diction and imagery. Our poets' best is written in a mode not luminous with the mere sunshine; it hues nature with enchantments more radiant than any wrought by Celtic witchery; it gives to life a finer temper than the iron of the North. Something is embodied from each of these modes, but all is transmuted to the evolved vitality of a new *English* mode. A charm of mystery it has, and a breath of suspense, like childish trepidation lest a too dear caress might crush the wings of beauty,—these, with reverence, as of awe for holy things.

Likely it would be better not to try to illustrate, where illustration is needless; yet sometimes the quoting of a poem which haunts the mind as embalming the essence of the thought will serve to fix even most familiar qualities. In Poe's earlier stanzas *To Helen* the allusion is classical, but the beauty of the poem is not born from the sunny foam of the Mediterranean:

Helen, thy beauty is to me
 Like those Nicean barks of yore,
 That gently, o'er a perfumed sea,
 The weary, way-worn wanderer bore
 To his own native shore.

On desperate seas long want to roam,
 Thy hyacinth hair, thy classic face,
 Thy Naiad airs have brought me home
 To the glory that was Greece
 And the grandeur that was Rome.

Lo! in yon brilliant window-niche
 How statue-like I see thee stand!
 The agate lamp within thy hand!
 Ah! Psyche, from the regions which
 Are Holy Land!

But it is in our poetry of wood and field that we oftenest meet unalloyed the native quality. Perhaps this is because spring-tide rapture and delight in blossoming hedgerows is the oldest lyric instinct of our race. To the ancient Northmen the freeing of the mother of earth's fruitfulness—loveliest of goddesses—from the icy embrace of Fafnir was the great year-joy,—com-

parable only to the pathetic rapture of the lone Greenland Esquimaux at the Phoenix-birth of the sun after the dead winter months. The token of the Spring set free was the greening turf; and just as the Esquimaux greet the new sun with hymns, so the old Teuton sang springtime in. Nature's kindlier England has but fostered the ancient paganism, till it has come to pass that not any poet of the mother-tongue begins his pilgrimage of minstrelsy save he prologue it with April and with May, some hymn to Spring which is his heart's libation to his native Muse.

And throughout, English poetry is mainly a nature poetry. At the beginning spring and meadow-green, but the whole year gathered into the final song. Storm is there with bird-trill, the doming blue of the sky with the sheltered violet. And all nature is alive, too,—this perhaps from the Celt. The life is not a pantheistic world-vitalism, as with the Brahman, nor anthropomorphic embodiment, as with the classic peoples. The Oriental, realizing human impotence, seeks peace in the tropic seductiveness of spiritual slumber, losing self and its desires in the waste waters of a cosmic sea. The Greek, though well aware of his mortality, effects an ideal conquest of nature; she is no longer mistress, but is ruled by myriad human-like gods and demi-gods, by nymphs and dryads who make her their habitat, by mortals who have conquered mortality; the very vividness of Greek desire compels the seeing of nature enslaved and ruddy flesh triumphantly enthroned. But with our less sunny temper it is otherwise. We have beheld a great vision,—from this our restlessness; but we have found nature jealous of our wish and potent to thwart it,—from this our sadness. Because of our dual derivation, we achieve no contentment. The Celt passionately worships beauty; the Goth clings invulnerably to his personality. Yet without abnegation of self and personal right, beauty cannot be attained. Here is that fundamental contradiction of temperament which gives a sense of tragedy underlying even our gaiety. Especially since Puritanism and Science have in turn cast sobering pall upon the merry-making instinct of the robust England of the Middle time, the chill and the dread have lain heavy upon

us. Sometimes we have had mad flyings at the throat of destiny, —Byron's way. Sometimes Saxon fatalism: no Oriental non-resistance, but the nerve-sundering struggle, the fight to the finish of the predestined loser. But again there is a softer mood, perhaps of all most truly characteristic. Contrasted with the classical, in place of light it yields mystery, in place of joy wistfulness, in place of imaginative embodiment aspiration. So Keats,—

She dwells with Beauty—Beauty that must die;
And Joy, whose hand is ever at his lips
Bidding adieu; and aching Pleasure nigh,
Turning to poison while the bee-mouth sips:
Ay, in the very temple of Delight
Veil'd Melancholy has her sovran shrine. . . .

Nature can never again appear pastoral and Arcadian. We have been too well taught that her law is the Survival of the Fittest, her life the Struggle for Existence. And beauty may henceforth never lie in mere sunshine. We have seen afar a more radiant glory transfiguring a loftier world. If we grieve because we cannot reach that world, it is with no mean or selfish grief. Rather it is ache of a fine regret that we cannot be better than we are.

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