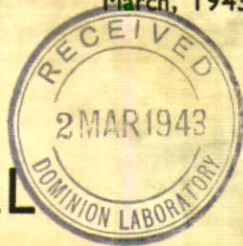
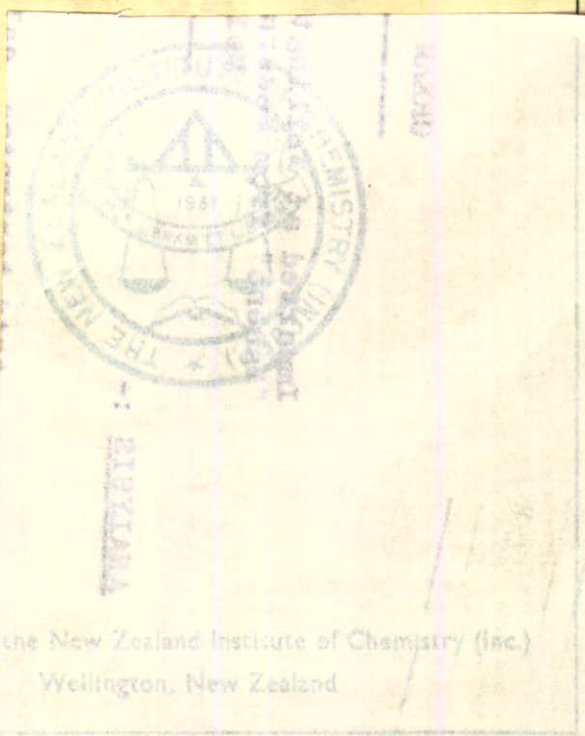


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**INSTITUTE of CHEMISTRY**



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**JOURNAL**  
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**EDITORIAL**

In his Presidential Address which we publish in this issue, Sr Theodore Rigg presents for our consideration his views of the large problems which must be solved in the future, if individual men and women are to be allowed to live their own lives in peace and security, and if individual institutions such as ours are to carry out their immediate functions and solve their own lesser problems. He takes his stand as a citizen and a man of science, with those who see in world federation the best hope of achieving at least a reasonable measure of success in the tremendous task confronting us. One of the tragedies of the situation we are living in is that the events of the past twenty years which lead the President to his conclusion, are interpreted by others as justifying quite contrary courses of action. Some see economic crises as the result of hidden money power, and condemn proposals for federation as the latest scheming of such power. Some see war merely as the crime of guilty men and guilty nations. With the defeat of those nations now emerging as certain, they look to a return to unrestricted national sovereignty, with the Axis powers policed by the Great Powers of the United Nations. Geographical factors are against such a solution, quite apart from human ones. The people who live in the industrial area of North-west Europe will always be industrially strong. Industrial strength in the modern world is military strength. The problem needs a bold solution. The President advocates the boldest.

It would be wrong to suggest that the Institute as a body should pronounce dogmatically on these high matters. It is unlikely that all would agree upon them. But it is right that they should be discussed among us. We deplore the tendency apparent today to "leave to the Government" decisions of all kinds which we should assist in forming. As Sir John Orr's writings show, scientific men have knowledge and information which is relevant to a sound approach to our problems.

The Institute has already played a valuable role in relation to the Medical Advertising Bill. It has a role to play also, however small it may appear, with other democratic institutions, in forming that public opinion which, working through our representative institutions, must mould the future to our desires.

## DR. H. G. DENHAM

It is with very deep regret that we record the death of Dr. H. G. Denham, Rector and Professor of Chemistry of Canterbury University College, and Chairman of the Council of Scientific and Industrial Research.

A note on his election to the Honorary Membership of the Society of Chemical Industry was prepared for publication in this issue, but will now be incorporated in an appreciation of his work in the June issue.

## POST WAR RECONSTRUCTION—WORLD FEDERATION ?

Presidential Address delivered by Sir Theodore Rigg to the N.Z. Institute of Chemistry, September 29th, 1942.

Although the overthrow of Nazi tyranny and Japanese aggression must be the first objective of the United Nations, it is nevertheless very desirable that careful consideration should be given to post-war reconstruction, so that the maximum benefit may be secured for all peoples in the peace settlement. It is now well known that the Treaty of Versailles, following the Great War had many defects which fostered ill-feeling, dislocated trade and adversely affected the peaceful solution of international problems. The association of the League Covenant with the Treaty, the imposition of large indemnities, the disarmament clauses of the Treaty, the failure of the U.S.A. to join the League Council, and the absence of any method of altering the status quo, other than by unanimous vote of the League Council, were all serious obstacles to the resumption of normal relations between nations, and the peaceful solution of problems connected with the supply of raw materials, and of trade. Countries like Italy and Japan, with few natural resources, were perhaps in a more disadvantageous position than other nations, but in the case of no nation was prosperity continued without serious check and grave unemployment. In Germany, Great Britain and U.S.A., during the height of the world depression of 1929-32, many millions of men were unemployed and lacked even the simple necessities of life. Moreover, even in those countries with great natural resources, such as Great Britain and the U.S.A., official surveys show that a considerable percentage of the population, even in normal times, is unable to purchase sufficient of a varied diet to maintain a satisfactory health standard. It must be remembered that these conditions among the working population of all countries were manifest at a time when giant surpluses of foodstuffs and raw materials were accumulated in the agricultural countries of the world. While conditions in western countries may be considered bad in relation to the equitable distribution of necessities to their population, the state of the peoples of China and India was inconceivably worse. In both cases, the great mass of the people, probably comprising more than 60 per cent of the population is on a subsistence ration which is inadequate both in amount and in quality to maintain optimum health of the people.

Post-war planning should take into account not only the defects in the Treaty of Versailles, but must remove as far as possible the underlying causes of war, e.g. fear, jealousy, ruthless competition. A satisfactory peace settle-

ment must give the maximum security and a better standard of living for all peoples. The present crisis in the affairs of mankind has demonstrated conclusively that nations cannot live to themselves, and that the fate and prosperity of each is dependent to a marked extent on harmonious relations and the prosperity of all.

### Impact of Science on Western Civilisation.

A hundred years ago, the industrial revolution was only in its infancy. Man lived by the sweat of his brow; he was engaged in farming pursuits or in handicrafts; he was not organized for factory production; he thought little about foreign peoples or policy. Armaments and armed forces of western countries were on a comparatively small scale, and the civilian population was not called upon to play any important part in time of war. The past century, however, has seen unexampled progress in the application of science to industry. Moreover, the telephone, radio, and the aeroplane have brought about revolutionary changes in our contacts, not only with fellow nationals, but with all peoples throughout the world. Today, Churchill, Roosevelt and other outstanding men broadcast to the world; their statements are eagerly awaited by a multitude of people, and influence greatly the hopes and aspirations of many millions scattered throughout the different countries of the world. As illustrations of the influence of science on material development in western civilization, one might mention the important part played in agriculture by the chemist, the plant breeder, and the engineer. The great expansion of the fertilizer industry, the production of synthetic nitrogen, plant improvement, and the mechanization of farms, have enabled the farm worker to double his productive capacity. In this connection, New Zealand is an outstanding illustration of the very rapid application of science to farming, contributing very considerably to the attainment of a world record in productive capacity of nearly £500 per farm worker per annum. India, on the other hand, may be quoted as an illustration of an agricultural country where comparatively little yet has been achieved in the application of science to farm management, and where the productive capacity of the farmer stands at the incredibly low figure of £12—£18 per annum.

Although in countries like India and China, with their vast populations, difficulties may be experienced in providing within their national boundaries sufficient foodstuffs for the satisfactory health of their peoples, yet nevertheless the application of science to farming does render possible immense improvement in the standard of living of all peoples, provided a suitable vehicle of distribution can be established.

The rise of secondary industries throughout the world has had an unparalleled effect on the lives of many millions, and has enriched our standard of living, although many problems connected with unemployment and social conditions have been experienced. Some of the more important developments in the application of science to industry in recent years are as follows: (a) the use of the lighter metals, aluminium and magnesium for many constructional purposes, where both lightness and textural strength are required; (b) the rapid development of synthetic products such as motor fuel by the hydrogenation of coal, and the treatment of shales; the rayon industry and the staple fibre industry, both of which in a period of a few years have attained outstanding production in the more important countries of the world; synthetic rubber production both in Germany and Russia, and now in the U.S.A.; the production of wool substitutes, e.g. lanital from casein, and sylkoid from soya bean; the development of plastics which replace both wood and metal in their use in the factory and in the home.

The development of all these new industries is founded on the work of scientists in many countries. It seems to lie within the realms of possibility that all peoples may enjoy many commodities which formerly were unattainable through dearth of raw materials, and the necessary factory

establishment. While the achievements of science have been spectacular in their effect on industry throughout western countries, the common man has so far received only a portion of the benefit which might have been expected under wise planning, and a satisfactory system of distribution.

On the other hand, science has been applied with equal concentration to the production of instruments of war for the destruction of mankind. The aeroplane, the tank, artillery, and explosives have all received their share of scientific research, while the factory system of production has enabled in time of war all these instruments of war to be manufactured on a gigantic scale, which was inconceivable even ten years ago. The destructiveness of modern warfare, the direction of the whole resources of countries, including the civilian population, to the war effort not only results in appalling losses of men and material, but also in a decline in moral and spiritual values. In the Great War, nine million men were killed, twenty-two million seriously wounded, and six million men were missing. The influenza epidemic, coming at a time of denuded vitality, caused more deaths than the actual warfare.

In the present war, the losses of men so far have not been as great, particularly in the case of Great Britain and France, but we are far from the final count of losses which must be sustained before the war is over. Already the losses in Poland, Russia, China and even Germany number many millions. It must be anticipated that famine conditions, and probably disease, in occupied Russia, Poland, Greece and other parts of Europe and also in China must involve millions of the inhabitants before relief can be obtained. H. G. Wells for many years has expressed the opinion that if the peoples of the world do not abolish war, war will destroy them. In looking back over the past twenty-five years, despite the wonderful achievements of science, man has not received corresponding benefit. He has been overwhelmed by two world wars; he has lacked security, and has been frequently short of the necessities of life.

Before a plan for the future can be drawn, it is essential to know what are the chief wants of man. Perhaps Roosevelt's statement of the "four freedoms" gives a simple and fairly clear picture of those things which are essential to man's well-being. They are: freedom from fear; freedom from want; freedom of speech; and freedom of worship. If it be admitted that these are the important things in so far as man's happiness is concerned, they must very definitely receive consideration in post-war planning. A peace settlement embracing in its policy these "four freedoms" should do much to eliminate wars, and should give to the peoples of the world greater freedom, and a higher standard of living than they formerly enjoyed. It is not a reconstruction of the old order of national and international affairs that is required, but a new order of human relationships based on justice, equality and freedom for all men.

The Atlantic Charter signed by the two outstanding statesmen of the United Nations has received very general approval and we cannot but infer that the principles and proposals enunciated by Roosevelt and Churchill do represent real objectives of the U.S.A. and Great Britain, and indeed of all the United Nations.

If the Charter is incorporated into the peace settlement it must involve profound changes not only in our attitude to other nations, but in economic and social conditions, not only within the British Commonwealth of Nations but in all the countries of the world. The fourth, fifth and sixth clauses of the Atlantic Charter go much further than any programme previously proposed.

It may be desirable to refresh our memories concerning these clauses. They read as follows:—

**Fourth Clause:** "They will endeavour with due respect for their existing obligation, to further the enjoyment by all states great or small, victorious

or vanquished, of access, on equal terms, to the trade and to the raw materials of the world which are needed for their economic prosperity."

**Fifth Clause:** "They desire to bring about the fullest collaboration between all nations in the economic field with the object of securing for all improved labour standards, economic advancement and social security."

**Sixth Clause:** "After the final destruction of Nazi tyranny they hope to see established a peace which will afford all nations the means of dwelling in safety within their own boundaries and which will afford an assurance that all men in all lands may live out their lives in freedom from fear and want."

It must be remarked that the Atlantic Charter was framed before the entry of Japan into the world war, otherwise further amplification might have been made by the two statesmen.

The implications of these three clauses are immense and must involve great changes in our policy of development of raw materials, in trade relationships and in the export of capital to the poorly developed countries of the world. Do we New Zealanders uphold the provisions of the Atlantic Charter? Will we think in terms only of New Zealand and the British Commonwealth of Nations, or in terms of mankind of whatever colour and of whatever race? What are we prepared to do to restore Europe, to improve the standard of living in China or India, and to give to those countries with poor natural resources like Italy and Japan their due share of raw materials and trade. These questions must be answered before a satisfactory peace settlement can be hammered out and before a national policy for post-war development in New Zealand can be framed. The implications of the Atlantic Charter really go further than a mere question of equality in trade and raw materials, for one of the most frequently declared aims of the United Nations is the freedom of peoples who suffer from the aggression of neighbouring powers. We aim to assist China to overthrow Japanese aggression. If Japan is expelled from China the privileges of western powers in China must likewise be abolished. If China has freedom, why not freedom for India, Burma and the Dutch East Indies? It must be mentioned that already the Philippines have been recognised by the U.S.A. as an independent country—a position which has been brought about by the Japanese occupation of the Philippines. The position of colonial dependencies must likewise come under review. There must be less exploitation of colonial dependencies and a more honest effort to train the peoples for self-government and develop their countries in the first instance for the benefit of the inhabitants and secondly for the general benefit of all men of whatever nationality. Answers to these questions must be forthcoming by the United Nations before a peace settlement can be advantageously made and a post-war programme established. Although it is not clear to what extent agreement will be effected on the different points which have been enumerated, it is clear that the provisions of the Atlantic Charter cannot be implemented unless there is an established authority capable of regulating armaments, foreign and economic policies and other matters of common interest.

#### What Form shall this Authority Take?

In considering the form of an established authority for regulating matters of international interest, several possibilities occur to the mind.

- (1) An alliance of the U.S.A., Great Britain and Russia to preserve the peace of the world and to regulate economic and trade policies.
- (2) A league of nations on the lines of the former League which operated after the conclusion of the Great War.
- (3) Regional federations of nations; for example, a European union, an American union and a Pacific union.

(4) World federation, comprising all nations with independent governments.

An alliance of the three great powers at present responsible for waging war against the Axis powers should undoubtedly, when victory has been obtained, insure the preservation of peace for many years to come. All three nations have immense natural resources, are highly equipped industrially, and can call upon a great reservoir of man-power. It is a foregone conclusion that these three powers must take the major share in disarmament of the aggressor nations and in the restoration of Europe, China and other devastated areas affected by the World War. It is most unlikely, however, that these three nations would be prepared indefinitely to shoulder the responsibility and burden of maintaining order throughout the world. It is almost certain that they would be regarded as dictator countries in exactly the same sense as Europe today regards Germany and Italy, or the Pacific countries regard Japan. It would result in the alignment of the nations of the world into two groups—the master races and the slave races.

The League of Nations failed mainly because the nations of the world refused to allow any infringement of their so-called sovereign rights. A unanimous vote of the League Council was required to effect any important change in the status quo. As a result of the jealousy and the inequality existing between nations, particularly in Europe, a unanimous vote was an impossibility. Under these circumstances there was little possibility of effecting desirable changes which evolution and course of time inevitably demand. It is not easy to see how any new league or council would do any better than the old league unless that council was vested with supreme authority on behalf of the nations of the world.

The Axis powers have suggested the desirability of creating regional unions as a basis of world government. A European union covering the countries of Europe but not Great Britain, an American union covering North and South America, and a Pacific co-prosperity block covering Japan, China, the Philippines, Dutch East Indies, Indo-China and Malaya have been mentioned by the Axis powers. The position of Great Britain and Russia in connection with these regional unions is not clear, nor has the position of India, South Africa, Australia and New Zealand been defined. While there may be certain advantages, both in Europe and in the Pacific, for very close relationships between neighbouring countries which have reached a somewhat similar level of culture and standard of living, these advantages would also be obtained in a system of world federation. There are, however, many disadvantages in a system of government based on regional unions, in that the position of Great Britain would be most unsatisfactory because she obviously has great interests in Europe in addition to close ties overseas in Canada, South Africa, India, Australia and New Zealand. The creation of such regional unions would give certain countries dominance; for example, Germany in Europe, United States of America in the Americas, Japan in the Pacific, by virtue of their strong industrial organisation. Moreover, the day would come when serious differences of opinion might arise between the different regional unions over territory, trade and economic policies.

A federal union of nations possessing sovereign rights should give the best guarantee of permanent security and of international co-operation and appears to be free from many difficulties which are associated with other forms of world organisation. Such a union is clearly desirable on account of the dependence of almost every country on some raw material beyond its borders, or upon trade with other countries. The freedom of the air and sea is of importance, if not essential to all countries. The creation of common interests and common goals would be better served under a federal union than under any other authority.

## World Federation. What is it?

W. B. Curry has outlined in his book "The Case for Federal Union" suggestions and proposals advocated by those who uphold federal union as the best organisation for world government. He suggests that federal union, or world federation, should consist in the union of nations possessing independent governments for common action in matters which affect their common interests. It would involve the transference of certain rights and functions, possessed by individual nations, to an international authority on which they were represented. The following matters are suggested by Curry as coming within the jurisdiction of the international authority:—

(1) International relations (all national foreign offices would be abolished and replaced by international offices owing allegiance solely to the international authority in the form of assembly, senate or commission which may be appointed).

(2) Armed forces of the sea, air or land would be pooled, owned and directed by the international authority. NOTE: This would include armament works, air and naval bases throughout the world.

(3) Economic relations between nations, development of raw materials and trade would be controlled by the international authority.

(4) Currency control would come within the purview of the international authority and arrangements should be made for lease and lend help along the lines of the policy already implemented by Roosevelt.

(5) The control and improvement of communications between the nations of the world.

(6) The development of colonial dependencies.

(7) The movement of populations where this may become desirable and essential for the harmonious life of peoples inadequately provided with living space.

(8) The development of world public opinion based on justice, freedom and equality.

Matters of purely domestic concern would still be controlled by national governments; Federal union does not prevent the development of national culture or dissolve the allegiance of citizens from existing governments. It does involve, however, the surrender of certain national rights to their representatives in an international assembly, court or commission.

Curry considers "A federal system is the logical application to the whole world of liberal, democratic government. By assuming control over those matters that concern mankind as a whole, the federal government gains all the advantages of a world super-state. By retaining separate national governments, having authority in those matters of mainly local concern, we retain national culture and advance liberty. The union of free men for the preservation of their liberties and the fostering of their common purposes is the basis of democracy. Federal union is the doctrine that enables us to apply throughout the world the only system of government which has hereto proved either tolerable or durable."

### Would World Federation be Successful?

In view of the bitter feeling which has now developed in the second world war, and of the divergent outlook of different nations of the world, a doubt may arise in many minds as to the success of a Federal Union.

There can be no doubt that difficulties will be encountered, not only in the reconstruction of Europe, but also of countries in the Pacific area, but nevertheless, under World Federation, with an assurance of fair treatment for all nations, political boundaries would not have such significance as they

have today, nor would the position of minorities within the borders of national states be quite so acute as it has been in the past. Destruction, loss of life, starvation, and misery caused by the present world war, will have brought clearly to the minds of the many nations involved in the present struggle, the necessity for devising a procedure by which war is eliminated. Moreover, we will be in a position both in Europe and in the Pacific, to start afresh without any obligations to restore political boundaries which were unsatisfactory or to re-instate privileges which had become obsolete. If the more powerful nations are determined to create a World Federation, there can be no doubt that the less important nations will only be too pleased to come within the Union. If the major powers are determined that a Union shall survive and function satisfactorily, there is not the least doubt that it will survive and that its position and authority will be improved with the passing years.

The Federal Union of fifty-one states comprising United States of America, the Federal Union of Canada, the Federal Union of the Australian States, and likewise the Federal Union of South Africa, are instances of considerable success in the achievement of common unity—a unity which in every case has been associated with rapid development of the countries concerned, and an improvement in the standard of living. Perhaps the Union of the United States of America is the best illustration of success, because of the diverse origin of the peoples inhabiting different states, and the some what wide difference in viewpoints, particularly in regard to negro slavery. It is true in the case of the U.S.A. that the authority of the Federal Union was challenged by the southern States, which wished to secede because they were not satisfied with the decision of the Federal Union in connection with the negroes. When one remembers the lack of communications in the early days of the American Union, the diverse origin of its people, and the wide difference in culture of the inhabitants of different States, it is not surprising that difficulties occurred. These difficulties have been surmounted, and today the value of their union is recognised throughout the length and breadth of the United States. It has given to all the peoples of the United States greater freedom, greater security, and a higher standard of living. Of no less interest is the Federal Government of Canada, which embraces people of several nationalities including a very large number of French-Canadians. Although differences of opinion between the French-Canadians and the English-Canadians are sometimes acute, they have succeeded in co-operating for the development of Canada as a whole, and the welfare of all Canadians.

Success in World Federation would depend on the decision of all the major powers to enter the Union; the inclusion of the U.S.A., the British Commonwealth of Nations and Russia would be vital to success, but it would be equally important that France, Germany, Italy, China and Japan were likewise members of the Union, actively co-operating in its functions. As many nations as possible should be included, even although there may be considerable difference in their culture and standard of living in comparison with the more favoured nations of the world. The inclusion of Germany, Italy and Japan at the outset of the Union is very desirable to prevent resentment and a feeling of frustration.

#### **Organization of Federal Government.**

The question arises as to the best method of creating the international authority. Should it be based on representation by nations appointed by the different Governments of the countries of the world, or should the central authority be elected by the peoples of the different countries on the same plan as the Federal Assembly and Senate of the U.S.A.? In order to avoid interference by national Governments, it is highly desirable that the central

authority should be elected directly by the peoples of the different countries within the Union. It is difficult to say on what basis of population representatives should be elected, but perhaps a minimum of one for a population of up to five millions, and a maximum of ten for countries with large populations might be fair enough basis for the election of a General Assembly. It may be found desirable to base representation on a group of countries which have a similar origin, and somewhat similar culture, e.g. Renner has suggested the possibility of a Scandinavian bloc to include Finland, Esthonia, Sweden, Norway and Denmark, a Balkan bloc covering Bulgaria, Rumania, Greece, Yugoslavia and Albania, a Dutch-British bloc, a Czechoslovakian-Polish bloc. Groupings of this nature from the point of view of representation might enable a fairer distribution of representatives in the General Assembly than otherwise would be possible.

### Primary Objectives of the World Union.

Sir John Orr in his article entitled "The Foundations of the New World Order" has denounced the old economic system which limited the production and distribution of food and other necessities of life urgently needed by the vast majority of men. In equal measure he has declared obsolete the old international political system under which we have suffered two world wars in one generation. He recognises the great importance of advancing an objective easily understood by common men in all countries of the world and securing agreement of all nations on such objectives. Success in the achievement of simple objectives paves the way for much wider co-operation. He states that "all men of good-will would agree that the first duty of Government is to provide the necessities of life for the people governed. The material necessities of life are (1) Food and (2) Shelter which includes a house, furniture, clothing and warmth. To these must be added (3) Work which is a psychological necessity." He recommends these as primary objectives of the New World Order. He further states that "this plan for building the new world from the bottom upwards would give expression to our growing spiritual idealism. Every great spiritual awakening calls for sacrifice. This plan involves sacrifice. In Britain those who already enjoy the necessities of life on a health standard—and that includes the well-paid worker—would need to stand back from the national table until those worse off are served. To accomplish the world food plan, the wealthy nations must give to the poor nations food, agricultural equipment and the other things needed to provide the necessities of life, not against a loan which would sink the poorer nations into debt, but on a world-wide lease-lend plan arranged by an international financial organisation, the security of which would be guaranteed by all nations including the poorest. The poorer nations would not be encouraged to pay interest in the form of money or exports which would delay the provision of the necessities of life on a health standard for the whole of their population. When they have reached that level they could begin to pay their debt in money or in kind. The nations would find their spiritual and economic salvation in this policy of giving." The adoption of the policy recommended by Sir John would be welcomed by many scientists and, I think, by the great majority of men in all countries of the world. It would demand the more equitable distribution of the necessities of life for the peoples, even of countries like U.S.A. and Great Britain which are considered wealthy. It would also involve a genuine effort to level up the wide differences in the standard of living prevailing in the different countries of the world. This can only be achieved by a great extension of the lease and lend aid initiated by President Roosevelt and adopted by Great Britain. Such aid will be required for the reconstruction of agriculture and industry in Europe, in Russia and in China. The industrialization of India and China must be a principal objective of international policy and likewise the more rapid develop-

ment of colonial territories. The co-operation of all nations in such objectives would forge new bonds of understanding and friendship, would greatly enhance spiritual values and would finally increase the prosperity of every part of the world.

### **The Place of Science in the New Order.**

Science is not confined by political or territorial boundaries. It is international in its outlook. It embraces men of all races, religions and colour.

It has already contributed greatly to the enrichment and enlargement of man's life. In the years to come the scientist is destined to play an even more important part in the development of the natural resources of the world, in the production of substitute commodities, in the control of disease and in the improvement of living conditions.

This suggests the necessity for scientific personnel, not only on all technical commissions dealing with the development of natural resources, the use of raw materials and the production and use of substitute commodities, but also on the central governing authority.

Scientific research should be encouraged and supported by the governing authority, and international research centres should be established in different parts of the world where problems of general interest to mankind can be investigated on a scale worthy of their importance. Medical research, the development of the food resources of the world, the development of raw materials and the conservation of the soil and natural resources of the world are some of the subjects which would come within the scope of the research programmes.

Of more immediate importance to the survival of civilisation will be the alleviation of distress which will be experienced on an unparalleled scale in Europe, in Russia and in China before peace is achieved.

The ability to supply food-stuffs of the right type, and in adequate amount will be one of the grave problems confronting the United Nations. The alleviation of famine, the control of disease, are as important to us as to the suffering peoples of Europe and China. The restoration of agriculture and industry in the devastated areas of Russia and Europe and of Asia will require the maximum possible contribution from many parts of the world.

The great importance of maintaining the primary industries of all countries outside the zones of conflict cannot be too strongly stressed. The provision of vitamin-rich foods, dried fruits, vegetables and canned foods will be of outstanding value.

Perhaps no country of the World is more deserving of help than China. After many years of disorder and more than five years of devastating war, she has achieved a unity of purpose which seemed impossible a few years ago. Chiang-Kai-Shek has shown himself a resolute leader, with the necessary strength and adaptability to overcome all obstacles in the creation and development of a united progressive China. He has gained the confidence of the great mass of the Chinese people and the full support of the intellectual classes. After five years of unparalleled destruction it will be necessary to rebuild the whole economic life of the country. Scientific help and capital goods for industrial development will be required on an immense scale to improve the standard of living for her vast population.

Adequate surveys of her natural resources and technical help for their development will be of the utmost importance in making a strong country, competent to assume its share of responsibility for stability in the Pacific.

By virtue of their geographical position both Australia and New Zealand must be deeply concerned with the future of China and should make every effort to give the maximum possible help.

## INSTITUTE ESSAY PRIZE

Members are reminded that the Institute Prize for the best essay on a subject concerned with Industrial Chemistry is offered for the first time this year, and entries must be received by the General Secretary not later than April 30th.

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## BRANCH NOTES

### AUCKLAND BRANCH

The Annual Report of the Branch records a 25 per cent increase in membership, the total now being 58. Three members are with the Armed Forces, and three are serving as munitions chemists in Australia.

The Committee for 1943 is as follows:—

Chairman—Dr. L. H. Briggs.

Committee Members—F. H. V. Fielder, W. Williams, R. Stansfield, S. G. Brooker.

Hon. Secretary—B. E. Jackson, C/o. The Shell Co. of New Zealand Ltd., Freeman's Bay, Auckland, C.I.

Hon. Auditor—A. J. Parker.

Delegate to Council—L. H. Briggs.

### PERSONAL NOTES.

Mr. C. H. Hassall, who until recently was a chemist at Reid N.Z. Rubber Ltd., has been appointed lecturer in Chemistry at Otago University to replace Mr. McGillivray, who has joined the R.N.Z.A.F.

Mr. Hassall and Miss M. Stokes have been elected Associates.

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### WELLINGTON BRANCH

The election of officers for 1943 resulted as follows:—

Chairman—Mr. G. S. Lambert.

Sec.-Treasurer—Mrs. P. W. Broad.

Committee—Dr. E. B. Davies, Messrs J. L. Mandeno, D. H. Freeman, S. J. Lambourne.

Council Representative—Mr. G. S. Lambert.

Hon. Auditor—Mr. G. A. Lawrence.

At the Annual Meeting it was announced that the Institute Prize for 1942 was awarded to Mr. J. L. Lambourne. Mr. L. H.

Davis gave a comprehensive report on progress with the Gas Identification and Decontamination Unit and the part played by Institute members. Mr. H. J. Proctor of the Physical Testing Laboratory gave an excellent demonstration of glass-blowing. He showed a very large stopcock with ground in stopper for high vacuum work, the first of its kind made in New Zealand.

Much work has been done by the Committee on the Laboratory Assistants' Certificate, the idea of which was originated by the Branch Chairman, Dr. J. K. Dixon. This should prove another avenue along which the Institute can help in maintaining a high standard of laboratory technique and in raising the salary status of chemical workers.

The new chairman, Mr. G. S. Lambert, began his career as Laboratory Assistant at the Thames School of Mines in 1928. From there he obtained a Mining Scholarship to the Otago School of Mines. In 1930 he was transferred to the Dominion Laboratory in Wellington, and took the degree of M.Sc. in 1933. He returned to the Thames School of Mines in November, 1935, and was Assistant-Director for two years. In January, 1938, he came back to the Dominion Laboratory where he is now a specialist in metallurgy and metallography.

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### CANTERBURY BRANCH.

Officers for 1943 were elected at the Annual Meeting in November as follows:—

Chairman—Dr. M. M. Burns.

Secretary—Mr. F. H. G. Johnstone.

Committee—Dr. R. O. Page, Messrs J. C. Forsyth, C. G. Mason, G. J. Warren.

Hon. Auditor—Mr. G. D. Law.

The business meeting was followed by an address by Miss M. P. Bartrum who discussed some problems in agricultural research in New Zealand.

The new Chairman, Dr. M. M. Burns, was first elected to the position for 1942, but military duties during the early part of the year prevented him from taking up his role. He was educated at Rangiora and Canterbury College, taking the B.Sc degree in botany and chemistry, and the M.Sc. in botany with a thesis involving much chemical work. He was Senior Scholar in Botany and in 1932 was awarded a post-graduate scholarship in Science, which took him to the MacCaulay Institute at Aber-

deen to work on soil chemistry. He obtained a Ph.D. of Aberdeen and went to Cornell University with a Commonwealth Fellowship in 1934. On his return to New Zealand he reported on tung-oil, and was then appointed to Lincoln College, where he is now lecturer in Soils and Fertilisers.

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### OTAGO BRANCH

The total membership remains at 50 and three members are serving with the Armed Forces. The Institute Prize for 1941 at Otago University was awarded to Mr. B. D. England.

Officers for 1943 are as follows:—

Chairman—Mr. H. G. Woolman.

Hon. Secretary—Mr. R. V. Peryman.

Committee—Professor F. G. Soper, Dr. R. Gardner,  
Messrs M. V. B. King, L. H. James.

The Chairman for 1943 is Mr. H. G. Woolman. He received his early education at the Friends' School, Lisburn, North Ireland, and at Bootham School, York. In 1921 he entered Victoria University, Manchester, and graduated B.Sc. Hons. in 1924. While he was employed as a science master in Belfast, he obtained the Diploma of Education. Mr. Woolman was then appointed to the experimental research laboratory of Messrs Vickers-Armstrong and held successively positions with the British Ministry of Agriculture and the Shell-Mex organisation. In 1931 he joined the technical staff of Reckitt & Son (later Reckitt and Colman) and arrived in New Zealand in 1938 to superintend the factory erection and production on behalf of Reckitt and Colman in Dunedin. Mr. Woolman was elected A.M.I. Chem.E. in 1934. Our new Chairman has many interests outside his work, being President of the Dunedin Photographic Society, and also actively engaged in E.P.S. work. He had a most successful athletic career in Great Britain.

The Institute as a whole is not responsible for statements and opinions appearing in this Journal.

Correspondence should be addressed to Dr. H. N. Parton, Canterbury College, Christchurch.

The address of the Hon. Secretary is P.O. Box 250, Wellington.

## CORRESPONDENCE

10th December, 1942.

Dear Sir,

Many thanks for your letter of the 6th ultimo and the copy of the Journal of the N.Z. Institute of Chemistry for September, 1942. The delay in replying has been due to the mislaying of my notes, which I have just found.

When I was asked to give the address very little time was available in which to prepare detailed notes or a paper, so it was based upon some miscellaneous notes which had been prepared previously for my own information. I enclose a copy of those which have reference to the point under review.

Shortly after arriving in N.Z. about two and one-half years ago, I became interested in the iron sands on the West Coast, near Auckland, and spent several week-ends making a rough survey. The depths mentioned in the notes are based upon evidence revealed by washouts, dunes and the like, and in my opinion are conservative. Areas have been taken with the aid of a planimeter and a map prepared by the Lands and Survey Department. It is realized, however, that the figures must be regarded as giving an indication of the situation rather than a precise estimate.

It seems that the real difficulty lies in whether I stated that N.Z. had enough ore to supply itself and Australia for 500 years or to supply N.Z. alone. My notes show the latter to be true. I have asked some of my colleagues who were present what was actually said and they are not certain. Whatever the situation may be, it seems clear to me that the problem warrants a vigorous and optimistic approach. The old cry that we are too small to attempt industrial work appears to have marked limitations. The costs of certain munitions and other engineering work now being carried out as part of the war effort have shown that along certain lines we can produce as low, and in some cases lower, than the current costs in England and U.S.A.

Yours faithfully,

Thos. D. J. Leech.

### Notes on Iron and Steel—New Zealand and Australia.

1. Reference—Official Year Book, Aust., No. 33/1940, page 303:  
“Estimates of the reserves at these places (Yampi Sound, W.A., and Iron Knob, S.A.) place the available quantities at approximately 100 million tons and 150 million tons respectively. In a report submitted to the Government, the Commonwealth geologist stated that, bearing in mind the expansion of the iron industry in Australia, these reserves were sufficient

for not more than two generations; and that unless supplies were conserved Australia would, by that time, become an importer of iron ore." With the stepped up production resulting from the war, this period may be approximately 50 years.

2. Reference—N.Z. Official Year Book, 1942; page 384:

"Although the whole of New Zealand's iron-bearing sands have not been surveyed, there is no doubt that the total quantity is enormous. A close investigation of the area in the vicinity of Patea has disclosed upwards of 50 million tons. The iron can readily be magnetically separated. The magnetic fraction averages 50-60 per cent Fe."

3. Reference—"Raw Materials of New Zealand's Mineral Industry," Prof. J. Park, The N.Z. Journal of Science and Technology, Vol. IX, No. 5, Feb. 1928; page 268.

"Iron—The quantity of the limonitic iron-ores of Parapara and Onakaka, Nelson, has been estimated to range between 20 and 30 million tons. . . . The iron content is about 45%."

4. Results of a rough survey made of West Coast areas near Auckland:

	Locality	Area sq. miles	Depth yards	Volume cu. yards
(a)	North Manukau Heads	1.10	10	33,000,000
(b)	Bethels .. ..	0.45	10	13,500,000
(c)	Piha .. ..	0.15	4	1,800,000
(d)	Muriwai .. ..	2.7	4	32,400,000

Total estimated volume 80,700,000

For S.G. = 3.8, i.e. 2.9 tons per cu. yd.

Total tonnage near Auckland is 234,000,000 tons.

To allow for silica and lime content 60% of this figure may be taken, i.e. iron ore in localities (a), (b), (c), (d).

	140,000,000 tons
Estimate of iron sand ore at Patea (see 2)	50,000,000 tons
Estimate of iron ore at Parapara & Onakaka	20,000,000 tons

Estimate for above sources 210,000,000 tons

5. Present consumption of iron and steel for New Zealand:

Approximately 150,000 tons of pig iron and steel; i.e. about 300,000 tons of ore.

6. Life of Deposits:

From 4 and 5, the approximate life at present rate of consumption is 700 years, say 500 years.

This estimate does not include many other areas.

8th February, 1943.

The Editor—Sir,

As one of the earliest sponsors for the establishment of a course of chemistry as applied to industry in New Zealand, I was particularly interested in your editorial of December, and also on the brief resume of the addresses of Drs. Denham and Page before the Canterbury Branch. A long and widespread contact with industry in New Zealand so much impressed me with the growing necessity of such a course that in 1937 I took the matter up with Dr. Marsden and enclose for your information a copy of a letter from me to Dr. Marsden outlining tentative proposals for a course of this description. At about the same period I had several discussions on the subject with Dr. Denham. One of the preliminary difficulties in inaugurating such a course is to decide whether it would best be conducted as a part of the already established technical education under the Technical Colleges or as a part of the curriculum of the University Colleges. Personally I do not think that this is a vital factor provided the course is established and run on sound lines. Other countries of the Empire provide examples where both systems are giving successful results. The nearest notable example of a Technical College is Sydney where a very complete course in Chemical Technology is provided and the degree or diploma conferred at the completion is, from all accounts, considered to be equal to a Bachelor degree. However, as the outcome of my discussions with Dr. Marsden we had a small deputation to the then Director of Education to see if such a course could be established in one of the Technical Colleges. As a result of this conference investigations were to be made as to the feasibility of establishing such a course but perhaps lack of support for the project and failure to adequately follow the matter up, caused it to slide into the background. In the intervening five and a half years since this deputation, especially during the present war period more members of the profession have had this problem forcibly brought before their notice and the time may now be ripe to once more take the matter up and see what can be done to bring such a project to fruition.

Yours sincerely,

G. A. Lawrence.

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[Space limitations prevent publication of Mr. Lawrence's interesting and valuable views on this subject till the June issue. Ed.]

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