Atlas of Israel*

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FOLLOWING the lead given by Finland in 1899, Israel, in common with many other countries, is now producing a national atlas—the *Atlas of Israel.*

To the geographer Israel poses some peculiar problems, which stand out during the compilation of a national atlas and make an atlas of Israel distinct in quite a number of ways from the average work of this type.

First and foremost: very few national atlases (as distinct from atlases of limited local regions) portray such a small area as the Atlas of Israel, for the total area of Israel is no more than 20,700 sq. km., comparable in size to the state of Massachusetts. This allows and even requires the cartographic representation in an atlas of Israel to be on a scale much larger than that used in most other atlases. Whereas the scale of the average map in most national atlases is between 1:1,000,000 and 1:15,000,000,[1] most of the scales employed in the Atlas of Israel range from 1:750,000 to 1:2,000,000, with a few maps drawn to a scale of 1:500,000. In fact, the size of the Atlas of Israel was so chosen that one sheet exactly accommodates four maps of Israel to a scale of 1:1,000,000. These relatively large scales make the compilation of the Atlas of Israel much easier, so far as generalization is concerned. On the other hand, they require a high standard of accuracy and detail for a country-wide cover.

Considerations of scale apply not only to the map base, but also to the conventional signs used. When a subject is portrayed with the aid of signs, e. g. circles, which are proportional in size to the quantity of the phenomenon, the scale of magnitudes has to be carefully chosen, so that in its smallest size the sign can

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[1] Range of scales of some national atlases:

Suomen Kartasto (Atlas of Finland): 1:1,000,000—1:13,000,000.
Atlante Fisico-Economico d'Italia: 1:2,500,000—1:15,000,000.
Atlas de France: 1:1,000,000—1:10,000,000.
Atlas över Sverige: 1:2,000,000—1:12,000,000.
Atlas de Belgique: 1:500,000—1:2,000,000.

still be perceived without difficulty, while the largest size does not cover a disproportionate area of the map. This problem is ever-present in Israel, where a marked concentration of population, industry, commerce etc. is found in and around Tel Aviv.

Maps generally, and atlas maps with them, become outdated and obsolete in time. Every map requires revision in order to keep it up-to-date, and this applies to national atlases as well. But in few countries is the rate of development so rapid as in Israel. Here, within the last two generations, agriculture in most of the country has changed from extensive growing of field crops to a highly intensive agriculture which in a considerable part of the State of Israel is based entirely on irrigation. Population has increased by nearly 500 per cent., and the increase in the number of settlements is extremely high. Parallel with this is the encroachment of built-up areas on former agricultural land. Needless to say, the development of the road net, of industrial installations and of all kinds of public services is in keeping with this, and profound changes have also affected the trade pattern.

It is this dynamic quality which has distinguished Israel since the end of the last century; it is this that makes the country so interesting a field of study that it is worth devoting a full-sized national atlas to it,[2] despite the small size of the country. It has therefore been a guiding principle of the editors of the Atlas of Israel to provide time-sequence maps for as many aspects of the geography of the country as possible.

Only by this means is it possible to arrive at a proper appreciation of the inherent factors in the development of a given feature. The distribution of population, for example, is illustrated by maps for five different dates between 1887 and 1953, and those of Jewish settlements by seven maps from 1895 to 1956. Citrus cultivation is given for three dates: 1922, 1937, and 1956, and the geography of industry for three dates: 1937, 1943, and 1955; and so on. In a larger frame the development of the landscape of the country is given in six maps, the first of which represents the natural landscape as expressed by the climax vegetation, and others the map of Palestine about 1800, in 1875, 1930, 1946, and at the present time. It is interesting to note that this principle of representation by means of time-sequence series is not limited to the field of human geography.

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[2] The Atlas of Israel will contain some 100 sheets with a total of over 600 maps; the size of each sheet is 50 × 70 cm. (20″ × 28″).

It applies, for example, to maps of the climatological section as well, where, in addition to the average rainfall maps for the international period 1921-1950, the change in the average rainfall amounts between the international periods of 1901-1930 and 1921-1950 too is represented on a map.

There is one definite advantage in basing a national atlas on time-sequence maps: it makes it relatively easy to add a later-dated map of a given feature to the sequence. Furthermore, an atlas employing this principle will never lose its interest, for it portrays evolution and not merely static conditions.

A particular difficulty in dealing with the geography of Israel and compiling a national atlas for this country is the frequency of political change in Palestine. Throughout the 19th century and until 1917/18 Palestine was part of the Ottoman Empire; after World War I it became a British mandated territory. In 1923 the Emirate of Trans-Jordan was set up, and in 1946 the Hashemite Kingdom of Jordan was established in the part east of the Jordan Valley. In 1948, after the termination of the British Mandate, most of the country west of the Jordan became the State of Israel, while almost the whole of the rest of it was incorporated in Jordan. We have thus, within 35 years, three basically different political frameworks within the area covered by the Atlas of Israel. None of these conforms to the natural geographical region known as Palestine in historical sources and in scientific literature. As a geographical region, the old term 'Palestine' applies to the habitable land of Mediterranean climate between the shore of the Mediterranean Sea and the deserts of the Arabian Peninsula, and between the Sinai Peninsula in the south and the mountain massif of Mt. Lebanon and Mt. Hermon in the north. That this area is a unit of regional geography becomes obvious on perusal of many maps in the Atlas of Israel, especially those dealing with geology, geomorphology, climate and biogeography. That it was recognized as a geographical unit as late as the end of the last century is expressed in the title of a famous reference work on the exploration of the country by Conder and Kitchener. The title of most of its volumes is 'Survey of Western Palestine', while the volume dealing with the country east of the Jordan is entitled 'Survey of Eastern Palestine'.

The political changes which have taken place in Palestine on both sides of the River Jordan within the period for which cartographic representation could be achieved in the atlas, i. e. since 1870,[3] have repeatedly changed the documen-

[3] Only the section on history contains systematic information pertaining to earlier periods.

tary basis for the material used in its compilation. Coverage of topographic and geological maps, climatological, population and economic statistics, and information of a more specialized scientific nature, are available for various periods and for varying areas. At the highest level of reliability, detailed information was available during the mandatory period for the British-mandated territory west of the Jordan, i. e. excluding Trans-Jordan. Today, equally reliable and often more reliable material is available for the State of Israel only. The Atlas of Israel found no satisfactory way to even out these differences in the reliability of its sources and has therefore referred maps of a given feature at various periods to various areas. Phytogeographic maps, for example, are given in a generalized form for most of the Near East, and in greater detail for all of Palestine, including the former Trans-Jordan. Most of the maps in the sections on human and economic geography show the former mandated territory of Palestine until 1947 and Israel only for later dates.

One particular difficulty in mapping Israel comprehensively is that the country lies on both sides of a major climatic boundary—the border of aridity. This divides the very intensively settled and cultivated northern part from the rather monotonous and empty southern section. To include the two in the same map and provide for a sufficient degree of variation in the representation of features in the north without creating a too monotonous picture in the south is a challenge to the cartographer. Thus, on most maps the contrast between the Mediterranean section and the desert parts of Israel is clearly evident. Furthermore, the high intensity of many features, especially those of human and economic geography, in rather small areas, poses the question how to give adequate expression to both high and low values at the two ends of the same scale of symbols, the extreme values occurring on the map quite close to one another.

The topography of Israel, too, poses a peculiar problem for the cartographer. As is well known, the surface of the Dead Sea is the lowest point on the face of the earth—nearly 400 metres below sea-level. Not far from it the mountains of Edom rise to 1200 and 1600 metres above sea-level. One has therefore to cover an altitude range of 2 km. on the map of Palestine. At the same time throughout most of the country features are rather moderate, with low mountains or hills rising between 150 and 500 metres above their bases. To represent these on a map requires a close spacing of altitude tints. To achieve this satisfactorily within a vertical interval of 2 km., without arriving at the higher end of the scale at colour values suggesting 'alpine' mountains, is a difficult task.

Furthermore, there is no set relation between certain types of surface features and certain levels of altitude, even within so small a country as Israel. To cite but a few instances: south of Haifa the coastal plain terminates at less than 50 metres above sea-level, and above it rise the steep slopes, and sometimes cliffs, of Mount Carmel. In the south, however, the coastal plain, without any definite break, rises to about 350 metres. The ridge and basin topography of Lower Galilee requires a clear distinction between the basins at 100 to 200 metres, and the ridges at 400 to 600 metres. These ridges have well-pronounced features, and therefore require either a suitably diversified sequence of altitude tints, or additional methods of representation. At the same time these tints have to form part of a sufficiently continuous sequence in order to avoid the appearance of breaking up slopes of 1 km. relative altitude and over, as found in the Dead Sea region, into a number of artificial steps not existing in nature. Moreover, one has to avoid showing the highest part of the walls overlooking the Dead Sea, and the 'Aravah Valley to the south of it, as knife-edged crests, as a result of their rising into the highest altitude range, while in actual fact they are merely the highest parts of consecutive, steep, west-facing slopes from which the land dips gradually and very slowly towards the east. The base map on some of the early sheets of the Atlas of Israel, e. g. sheet IX/3, shows the errors of this method of representation, a method which has been rectified in subsequent sheets.

Very varied types of source material are used in the compilation of the Atlas of Israel. They include purely historical sources, such as those used in compiling the sections on history, or reports of travellers who visited the country up to the end of the last century, which have been made use of in the compilation of the section on landscape evolution. Then there are statistical sources which are not always of equal reliability; data for earlier times, in particular, are sometimes inadequate. Some of the maps, especially in the sections on geology, geomorphology, and biogeography are based on original research, complemented by research especially carried out for the purpose of compiling the maps of the Atlas of Israel.

The Atlas of Israel comprises the following sections:

I. Cartography (planned to contain fourteen sheets) brings reproductions of ancient maps and such maps from the recent past as are milestones in the cartography of Palestine. Here, furthermore, will be found specimen maps of various series of the Survey of Israel and index maps to them.

II. Geomorphology (seven sheets) comprises landform maps, soil maps, and topographic cross sections.

III. Geology (three sheets) comprises geological and structural maps and geological cross sections.

IV. Climate (five sheets) contains detailed information on temperature and rainfall, a rather original representation of wind distribution, a cartographic representation of dew, and others.

V. Hydrology (three sheets) brings maps on underground water resources, and bottom contour maps for the inland lakes of the country.

VI. Phytogeography (two sheets) includes *inter alia* a large number of distribution maps of characteristic indicator plants.

VII. Zoogeography (three sheets) gives information similar to the preceding section for the fauna of the country.

VIII. Landscape Evolution (three sheets) endeavours to represent in cartographic form the transformation of the landscape of Palestine, which has been deeply influenced by man.

IX. History (fifteen sheets). As the correct appreciation of the landscape of a country so rich in history as Palestine requires an appreciation of the historical factor, this section has been given particular attention.

X. Population (seven sheets) shows the distribution and density of the population, its increase, and various demographic factors. Two sheets will show the global distribution of the Jewish people.

XI. Settlement (six sheets) shows the distribution of settlements according to size, topographic types of settlements accompanied by type sketches, development of Jewish settlement and of the built-up area of the three major cities, and maps of typical rural settlements.

XII. Agriculture (twelve sheets) gives distribution maps for various crops and agricultural practices as well as resources and utilization of water.

XIII. Industry and Commerce (eleven sheets) has maps on industry, finance and trade, electricity production and consumption, and the distribution of industrial manpower.

XIV. Communications (three sheets) contains sequence series for roads, railways and surface traffic development, and a sheet on air and sea communications.

XV. The final section, Services, will contain five sheets, mapping educational and cultural services, as well as postal, health, and judicial facilities. A special sheet portrays the distribution of the most interesting endemic diseases in the country, malaria and bilharziasis.

The Atlas of Israel is published in a number of folders, two of which are issued annually; each contains eight to twelve sheets. Maps are published as they are completed; the folders therefore do not contain maps of any particular section of the Atlas. Publication started at the end of 1956; five folders have been published so far, containing 47 sheets with 291 maps, as well as 66 drawings, diagrams, and small-scale maps accompanying the explanatory text. The atlas has been bound on the loose-leaf principle; new sheets can thus be inserted in their proper place, and if necessary sheets can be exchanged.